ATTACHMENT 1

Appendix D. Permits

Оригинал у юриста

O'ZBEKISTON RESPUBLIKASI
GEOLOGIYA VA MINERAL RESURSLAR DAVLAT QO'MITASI

Yer qa'ri uchastkasidan foydalanish huquqi uchun

LITSENZIYA

SERIYASI QQ TARTIB RAQAMI 0033 LITSENZIYA TURI F 1

O'zbekiston Respublikasi Vazirlar Mahkamasining 2009 yil 11 dekabrdagi 06/1-421-sonli topshirig'i asosida kon ajratish dalolatnomasi litsenziyaga qaytadan rasmiylashtirildi

Litsenziya "USTYURTGAZ"

Unitar sho'ba korxonasi nomidan
(ushbu litsenziyani olgan yuridik yoki jismoniy shaxs)

Boshliq PALUANBAEV MURAT ga berildi.
(litsenziya olish vakolati berilgan shaxsning familiyasi, ismi, otasining ismi, lavozimi)

Litsenziya foydali qazilmalarni qazib olish (uglevodorod xom ashyosi)
(yer qa'ri uchastkasidan foydalanish turi)
uchun yer qa'ri uchastkasidan foydalanish huquqini tasdiqlaydi.

Yer qa'ri uchastkasi "Surgil" gazkondensat koni

Qoraqalpog'iston Respublikasi Mo'ynoq tumani da joylashgan.
(Qoraqalpog'iston Respublikasi yoki viloyat tumani, aholi punkti nomi)

Yer qa'ri uchastkasi chegaralarining tavsifi, burchak nuqtalari koordinatalari, topografiya plani, kesimlar nusxalari va boshqalar ilovada keltiriladi I – 2009 y. 16 apreldagi 886-sonli kon ajratish dalolatnomasi; II – koordinatlari (maxfiy)
(tegishli hujjatning turi, nomi, tartib raqami va qabul qilingan sanasi)

III – Qoraqalpog'iston Respublikasi Mo'ynoq tumani xokimining 2005 yil 6 apreldagi 04-94-son
(davlat organi nomi, hujjatning turi, sana, tartib raqami)
qarori asosida yer qa'ridan foydalanish bilan bog'liq ishlarni olib borish uchun yer uchastkasi berish kafolatlangan.

Litsenziyani amal qilishi tugash muddati 2055 yil 20 may
(yil, oy, kun)

Quyidagilar litsenziyaning ajralmas qismlari hisoblanadi:

Yer qa'ridan foydalanish shartlari IV - sonli ilova
(ilovalarning tartib raqamlari, varaqlar soni)

Matnli ilovalar V - sonli ilova
(ilovalar nomi, varaqlar soni)

Chizma ilovalar
(ilovalar ro'yxati, varaqlar soni)

Litsenziya berilgan sana 2010 y. "20" may

Litsenziyani olgan korxonaning vakolatli vakili

M.O'. _____ F.I.O.
(imzo)

2010 "20" may

O'zbekiston Respublikasi Geologiya va mineral resurslar davlat qo'mitasi raisi

M.O'. _____ F.I.O.
(imzo)

2010 y. "20" may

(Litsenziya uning ajralmas tarkibiy qismi hisoblangan zarur ilovalar mavjud bo'lgan taqdirda haqiqiy hisoblanadi)

Republic of Uzbekistan

The State Committee of Geology and Mineral resources

LICENSE

For providing the legal rights on using the underground sites

Serial: 00 Index Number: 0033 Type of License: F1

On the basis of the task # 06/1-421 dated December 11, 2009 the Cabinet of Ministers of the Republic of Uzbekistan the License of Act of mining separation was re-registered.

This License is issued for to Paluanbaev Murat on behalf of USE "Ustyurtgas"

This license is approving the right of using the sites for trenching the underground resources (raw hydrocarbon fields)

Underground land site – GCC "Surgil" is located in Muynak District of the Republic of Karakalpkistan.

The underground land site's features, angular points, coordinates, topographic alignment, crossing points and etc., will be submitted in the Appendixes: The act on mining separation # 886 dated April 16, I-2009, II coordinates (confidential). On the basis of the decision of Muynak District Khokim #04-94 dated April 06, 2005 the using on the land site was guaranteed.

The License term of validity: May 20, 2055

The following is the integral part of the License:

Terms on using the land site: Appendix IV

Text Appendixes: Appendix V

Graphical Appendixes:

Date of License issue: May 20, 2010

The authority person of the License issuance:	The Chairman of the State Committee of Geology and Mining Separation
Full name:	Full name:
May 20, 2010	May 20, 2010

O‘ZBEKISTON RESPUBLIKASI
GEOLOGIYA VA MINERAL RESURSLAR DAVLAT QO‘MITASI

Yer qa’ri uchastkasidan foydalanish huquqi uchun

LITSENZIYA

SERIYASI 00 TARTIB RAQAMI 0035 LITSENZIYA TURI F-1

Litsenziya “USTYURTGAZ”

Unitar shu’ba korxonasi nomidan
(ushbu litsenziyani olgan yuridik yoki jismoniy shaxs)

Boshliq PALUANBAEV MURAT ga berildi.
(litsenziya olish vakolati berilgan shaxsning familiyasi, ismi, otasining ismi, lavozimi)

Litsenziya foydali qazilmalarni qazib olish (uglevodorod xomashyosi)
(yer qa’ri uchastkasidan foydalanish turi)
uchun yer qa’ri uchastkasidan foydalanish huquqini tasdiqlaydi.

Yer qa’ri uchastkasi “Sharqiy Berdax - Uchsay” gazkondensat koni

Qoraqalpog’iston Respublikasi Mo’ynoq tumani da joylashgan.
(Qoraqalpog’iston Respublikasi yoki viloyat tumani, aholi punkti nomi)

Yer qa’ri uchastkasi chegaralarining tavsifi, burchak nuqtalari koordinatalari, topografiya plani, kesimlar nusxalari va boshqalar ilovada keltiriladi I – 2004 y. 20 iyuldagi 619-sonli kon ajratish dalolatnomasi; II – koordinatlari (maxfiy)
(tegishli hujjatning turi, nomi, tartib raqami va qabul qilingan sanasi)

III – Qoraqalpog’ston Respublikasi Mo’ynoq tumani xokimining 2000 yil 6 oktabrdagi 606/10-son
(davlat organi nomi, hujjatning turi, sana, tartib raqami)
qarori asosida yer qa’ridan foydalanish bilan bog‘liq ishlarni olib borish uchun yer uchastkasi berish kafolatlangan.

Litsenziyani amal qilishi tugash muddati 2045 yil 10 yanvar
(yil, oy, kun)

Quyidagilar litsenziyaning ajralmas qismlari hisoblanadi:

Yer qa’ridan foydalanish shartlari IV - sonli ilova
(ilovalarning tartib raqamlari, varaqlar soni)

Matnli ilovalar V - sonli ilova
(ilovalar nomi, varaqlar soni)

Chizma ilovalar
(ilovalar ro’yxati, varaqlar soni)

Litsenziya berilgan sana 2010 y. "10" yanvar

Litsenziyani olgan korxonaning vakolatli vakili

(imzo) F.I.O.

"10" yanvar 2010 y.

O‘zbekiston Respublikasi Geologiya va mineral resurslar davlat qo‘mitasi raisi

M.O. (imzo) F.I.O.

"10" yanvar 2010 y.

(Litsenziya uning ajralmas tarkibiy qismi hisoblangan zarur ilovalar mavjud bo‘lgan taqdirda haqiqiy hisoblanadi).

Republic of Uzbekistan

The State Committee of Geology and Mineral resources

LICENSE

For providing the legal rights on using the underground sites

Serial: 00 Index Number: 0035 Type of License: F1

On the basis of the task # 06/1-421 dated December 11, 2009 the Cabinet of Ministers of the Republic of Uzbekistan the License of Act of mining separation was re-registered.

This License is issued for to Paluanbaev Murat on behalf of USE "Ustyurtgas"

This license is approving the right of using the sites for trenching the underground resources (raw hydrocarbon fields)

Underground land site – GCC "Berdak - Uchsay" is located in Muynak District of the Republic of Karakalpkistan.

The underground land site's features, angular points, coordinates, topographic alignment, crossing points and etc., will be submitted in the Appendixes: The act on mining separation # 619 dated July 16, I-2004, II coordinates (confidential). On the basis of the decision of Muynak District Khokim #606/10 dated October 06, 2000 the using on the land site was guaranteed.

The License term of validity: January 10, 2045

The following is the integral part of the License:

Terms on using the land site: Appendix IV

Text Appendixes: Appendix V

Graphical Appendixes:

Date of License issue: January 10, 2010

The authority person of the License issuance:	The Chairman of the State Committee of Geology and Mining Separation
Full name:	Full name:
January 10, 2010	January 10, 2010

Ўзбекистон Республикаси Вазирлар Маҳкамаси

ЛИЦЕНЗИЯ

АВ № 202

Мазкур лицензия билан "Ўзгеобурғунефтгазқазибчиқариш" акциядорлик компаниясининг
(лицензия эгасининг тўлиқ номи)
"Устюртгаз" шуъба унитар корхонаси

га

Газ ва газ конденсатини қазиб чиқариш ва уларни сотиш
(рухсат этилган фаолият тури)

билан

шуғулланишга рухсат этилади.

Лицензия эгасининг жойлашган жойи (почта манзили): Қорақалпоғистон Республикаси, Қўнғирот шаҳри, Гарезсизлик кўчаси, 110-уй

Лицензия эгасининг солиқ тўловчи сифатидаги идентификация рақами: 201740394

Лицензия берилган сана: 2002 **й.** 3 май

Лицензиянинг амал қилиш муддати беш йил

Реестр бўйича тартиб рақами: №21

Ваколатли шахс: К.Тўлаганов
(исми шарифи, фамилияси) *(имзоси)*

М.Ў.

Лицензиянинг амал қилиш муддати 2012 **й.** 3 май **гача узайтирилди.**

Ваколатли шахс: Э.Шаисматов
(исми шарифи, фамилияси) *(имзоси)*

М.Ў.

Лицензиянинг амал қилиш муддати _____ **й.** _____ **гача узайтирилди.**

Ваколатли шахс: _____
(исми шарифи, фамилияси) *(имзоси)*

М.Ў.

Republic of Uzbekistan

The Cabinet of Ministers

Licence

AB # 202

This License gives the permission on trenching the gas and gas condensate and their selling to the JSC "Uzgeoburgunnefgazqazibchiqarish" of the USE "Ustyurtgas"

Address (postal address)of the License holder: Republic of Karakalpakistan, Kungrad town, Garezsizlik Str., 110

Identification number of the License Holder as a Tax Payer: 201740394

Date of License issue: May 03, 2002

License validity term: five years

Registration number: # 21

Authority person: K. Tulaganov Signature:

Seal

License validity term: May 03, 2012

Authority person: E. Shaismatov Signature:

Seal

License validity term:

Authority person: Signature:

Seal

Замгубернатору

O`ZBEKISTON RESPUBLIKASI
SANOATDA, KONCHILIKDA VA KOMMUNAL-MAISHIY SEKTORDA
ISHLARNING BEXATAR OLIB BORILISHINI NAZORAT QILISH
DAVLAT INSPEKSIYASI

"SANOATKONTEXNAZORAT"

КОН АЖРАТИШ ДАЛОЛАТНОМАСИ № 886

2009 йил « 16 » апрел

Тошкент шаҳри

Ўзбекистон Республикаси Саноатда, кончиликда ва коммунал-маиший секторда ишларнинг бехатар олиб борилишини назорат қилиш Давлат Инспекцияси

(«Саноатконтехназорат»)

КОН АЖРАТИШ ДАЛОЛАТНОМАСИ

2009 йил «16» апрел да Ўзбекистон Республикаси Саноатда, кончиликда ва коммунал-маиший секторда ишларнинг бехатар олиб борилишини назорат қилиш Давлат Инспекцияси томонидан "Ўзбекнефтегаз" МХК си "Ўзнефтегазқазибчиқариш" АК си "Устюртгаз" УШК си га

(ташкилот ва корхонанинг тўлиқ номи ва унинг мансублиги)

ер юзаси илова қилинаётган планда белгиланган чегараларда "Сургил-Шимолий Орол" конидан фойдали қазилма газ конденсат қазиб олиш услубида ишлатиш ва саноат йўли билан қидирув ишларини бажариш учун кон ажратмаси ажратилди.

Кон ажратмаси Қорақалпоғистон Республикаси

(республика, вилоят, туман, қишлоқ номи)

Муйноқ тумани да жойлашган.

Ер юзасида 1, 2, 3, 4, 5, 6

бурчакли пунктлар билан белгиланган кон ажратмаси проекцияси майдони Ун минг олти юз йигирм икки (14622) га ни ташкил этади.

(сўз билан ёзилади)

Кон ажратмасининг амал қилиш муддати беш (5) йил.

Мазкур далолатнома икки нусхада тузилди ва 886 тартиб рақами билан «Саноатконтехназорат» Давлат Инспекцияси реестрига киритилди.

Корхона фойдали қазилма конини қазиб олиш учун ажратилган конда қуйидагиларни бажаришга мажбурдир:

фойдали қазилмаларни қазиб олувчи корхонанинг тасдиқланган лойиҳасига, кон ишларини ривожлантириш режасига, нефт, газ ва ер ости сувлари конларини қазиб олиш лойиҳалари ва сметаларига ҳамда техникавий фойдаланиш қоидаларига мувофиқ қазиб олиш;

ажратилган кон ва унга туташиб кетган ҳудудларда барча ер усти, ер ости иншоотларини, шунингдек атроф табиий муҳитни кон ишланмаларининг зарарли таъсиридан муҳофаза қилиш;

заҳираларнинг ҳолати ва ҳаракати, фойдали қазилмаларнинг камайиши ва аралашиб кетишини ҳисобга олиш, ишланаётган (ер қаърида вақтинча консервация қилинган) ва у билан қўшни конларда фойдали қазилмалар бузилишига йўл қўймаслик;

фойдали қазилма устида жойлашган жинслардан оқилона фойдаланиши, шунингдек уларнинг жинсларни хусусиятлари ва ернинг қайта тикланиши талаблари ҳисобга олинган ҳолда жойлаштирилишини таъминлаш;

ажратилган кон устидаги ҳудудда, шунингдек фойдали қазилмалар конларига туташ майдонларда «Саноатконтехназорат» Давлат Инспекцияси рухсатисиз иморатлар қурилишига йўл қўймаслик, конда фойдаланишда улардан фойдаланиш ёки портлатиш ишлари ва ушбу конларни, ишлатишда ҳосил бўладиган кўчкиларнинг хавфи ва зарарли таъсири ёйилиши мумкин;

кон ишлари бошланишидан 15 кун олдин, бу ҳақда «Саноатконтехназорат» Давлат Инспекциясига маълум қилиш.

Агар ер ости бойликларидан фойдаланувчи бир йил давомида ер ости бойликларидан фойдаланишга киришмаса кон ажратиш далолатномаси ўз кучини йўқотади ва у «Саноатконтехназорат» Давлат Инспекциясига қайтарилиши керак.

Фойдали қазилмаларни қазувчи корхона консервация қилинганда ёки тугатилганда объект тугатилиши ёки консервация қилинишига оид ишлар тамом бўлган кунда тўлдирилган геология ва маркшейдерлик ҳужжатларининг асл нусхалари 10 кун муддатда ўзининг юқори турган ташкилотига топширилиши, маркшейдер планлари, геология хариталари ва усти очиқ конлар нусхалари эса мана шу муддатда манфаатдор корхоналарга, ташкилотларга, шу жумладан қўшни корхоналарга берилиши керак.

Корхонага берилган кон ажратмаси бошқа корхонага берилиши таъқиқланади.

Кон ажратиш далолатномаси маркшейдерлик ва геология ҳужжатларининг нусхалари олинганлиги тўғрисида манфаатдор ташкилотларнинг тилхатлари нусхалари олинганлиги тўғрисида манфаатдор ташкилотларнинг тилхатлари нусхалари билан биргаликда кон корхонаси консервация қилиниши ёки тугатилиши ҳақида далолатнома расмийлаштирилгандан кейин 15 кун муддатда «Саноатконтехназорат» Давлат Инспекциясига топширилади.

Кўрсатиб ўтилган мажбуриятлар бажарилмаганлиги учун фойдали қазилмаларни қазувчи корхона раҳбарлари ва мансабдор шахслари қонунга мувофиқ жавоб берадилар.

М.Ў.

2009 йил «16» апрел

Ўзбекистон Республикаси Саноатда, кончиликда
ва коммунал-маиший секторда ишларнинг бехатар
олиб борилишини назорат қилиш Давлат
Инспекцияси бошлиғи

И.М.Холматов

(имзо, фамилияси, исми ва отасининг исми)

Republic of Uzbekistan

“SANOATKONTEXNAZORAT”

The State Supervision Committee on monitoring of the safety works performance in the industry, mining and public service sectors

Act on mining separation #886

April 16, 2009

Tashkent city

Оригинал у юриста

O'ZBEKISTON RESPUBLIKASI
GEOLOGIYA VA MINERAL RESURSLAR DAVLAT QO'MITASI

Yer qa'ri uchastkasidan foydalanish huquqi uchun

LITSENZIYA

SERIYASI QQ TARTIB RAQAMI 0033 LITSENZIYA TURI F 1

O'zbekiston Respublikasi Vazirlar Mahkamasining 2009 yil 11 dekabrdagi 06/1-421-sonli topshirig'i asosida kon ajratish dalolatnomasi litsenziyaga qaytadan rasmiylashtirildi

Litsenziya "USTYURTGAZ"

Unitar sho'ba korxonasi nomidan
(ushbu litsenziyani olgan yuridik yoki jismoniy shaxs)

Boshliq PALUANBAEV MURAT ga berildi.
(litsenziya olish vakolati berilgan shaxsning familiyasi, ismi, otasining ismi, lavozimi)

Litsenziya foydali qazilmalarni qazib olish (uglevodorod xom ashyosi)
(yer qa'ri uchastkasidan foydalanish turi)
uchun yer qa'ri uchastkasidan foydalanish huquqini tasdiqlaydi.

Yer qa'ri uchastkasi "Surgil" gazkondensat koni

Qoraqalpog'iston Respublikasi Mo'ynoq tumani da joylashgan.
(Qoraqalpog'iston Respublikasi yoki viloyat tumani, aholi punkti nomi)

Yer qa'ri uchastkasi chegaralarining tavsifi, burchak nuqtalari koordinatalari, topografiya plani, kesimlar nusxalari va boshqalar ilovada keltiriladi I – 2009 y. 16 apreldagi 886-sonli kon ajratish dalolatnomasi; II – koordinatlari (maxfiy)
(tegishli hujjatning turi, nomi, tartib raqami va qabul qilingan sanasi)

III – Qoraqalpog'iston Respublikasi Mo'ynoq tumani xokimining 2005 yil 6 apreldagi 04-94-son
(davlat organi nomi, hujjatning turi, sana, tartib raqami)
qarori asosida yer qa'ridan foydalanish bilan bog'liq ishlarni olib borish uchun yer uchastkasi berish kafolatlangan.

Litsenziyani amal qilishi tugash muddati 2055 yil 20 may
(yil, oy, kun)

Quyidagilar litsenziyaning ajralmas qismlari hisoblanadi:

Yer qa'ridan foydalanish shartlari IV - sonli ilova
(ilovalarning tartib raqamlari, varaqlar soni)

Matnli ilovalar V - sonli ilova
(ilovalar nomi, varaqlar soni)

Chizma ilovalar
(ilovalar ro'yxati, varaqlar soni)

Litsenziya berilgan sana 2010 y. "20" may

Litsenziyani olgan korxonaning vakolatli vakili

M.O'. _____ F.I.O.
(imzo)

2010 "20" may

O'zbekiston Respublikasi Geologiya va mineral resurslar davlat qo'mitasi raisi

M.O'. _____ F.I.O.
(imzo)

2010 y. "20" may

(Litsenziya uning ajralmas tarkibiy qismi hisoblangan zarur ilovalar mavjud bo'lgan taqdirda haqiqiy hisoblanadi)

Republic of Uzbekistan

The State Committee of Geology and Mineral resources

LICENSE

For providing the legal rights on using the underground sites

Serial: 00 Index Number: 0033 Type of License: F1

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This license is approving the right of using the sites for trenching the underground resources (raw hydrocarbon fields)

Underground land site – GCC "Surgil" is located in Muynak District of the Republic of Karakalpkistan.

The underground land site's features, angular points, coordinates, topographic alignment, crossing points and etc., will be submitted in the Appendixes: The act on mining separation # 886 dated April 16, I-2009, II coordinates (confidential). On the basis of the decision of Muynak District Khokim #04-94 dated April 06, 2005 the using on the land site was guaranteed.

The License term of validity: May 20, 2055

The following is the integral part of the License:

Terms on using the land site: Appendix IV

Text Appendixes: Appendix V

Graphical Appendixes:

Date of License issue: May 20, 2010

The authority person of the License issuance:	The Chairman of the State Committee of Geology and Mining Separation
Full name:	Full name:
May 20, 2010	May 20, 2010

O‘ZBEKISTON RESPUBLIKASI
GEOLOGIYA VA MINERAL RESURSLAR DAVLAT QO‘MITASI

Yer qa’ri uchastkasidan foydalanish huquqi uchun

LITSENZIYA

SERIYASI 00 TARTIB RAQAMI 0035 LITSENZIYA TURI F-1

Litsenziya “USTYURTGAZ”

Unitar shu’ba korxonasi nomidan
(ushbu litsenziyani olgan yuridik yoki jismoniy shaxs)

Boshliq PALUANBAEV MURAT ga berildi.
(litsenziya olish vakolati berilgan shaxsning familiyasi, ismi, otasining ismi, lavozimi)

Litsenziya foydali qazilmalarni qazib olish (uglevodorod xomashyosi)
(yer qa’ri uchastkasidan foydalanish turi)
uchun yer qa’ri uchastkasidan foydalanish huquqini tasdiqlaydi.

Yer qa’ri uchastkasi “Sharqiy Berdax - Uchsay” gazkondensat koni

Qoraqalpog’iston Respublikasi Mo’ynoq tumani da joylashgan.
(Qoraqalpog’iston Respublikasi yoki viloyat tumani, aholi punkti nomi)

Yer qa’ri uchastkasi chegaralarining tavsifi, burchak nuqtalari koordinatalari, topografiya plani, kesimlar nusxalari va boshqalar ilovada keltiriladi I – 2004 y. 20 iyuldagi 619-sonli kon ajratish dalolatnomasi; II – koordinatlari (maxfiy)
(tegishli hujjatning turi, nomi, tartib raqami va qabul qilingan sanasi)

III – Qoraqalpog’ston Respublikasi Mo’ynoq tumani xokimining 2000 yil 6 oktabrdagi 606/10-son
(davlat organi nomi, hujjatning turi, sana, tartib raqami)
qarori asosida yer qa’ridan foydalanish bilan bog‘liq ishlarni olib borish uchun yer uchastkasi berish kafolatlangan.

Litsenziyani amal qilishi tugash muddati 2045 yil 10 yanvar
(yil, oy, kun)

Quyidagilar litsenziyaning ajralmas qismlari hisoblanadi:

Yer qa’ridan foydalanish shartlari IV - sonli ilova
(ilovalarning tartib raqamlari, varaqlar soni)

Matnli ilovalar V - sonli ilova
(ilovalar nomi, varaqlar soni)

Chizma ilovalar
(ilovalar ro’yxati, varaqlar soni)

Litsenziya berilgan sana 2010 y. "10" yanvar

Litsenziyani olgan korxonaning vakolatli vakili

(imzo) F.I.O.

"10" yanvar 2010 y.

O‘zbekiston Respublikasi Geologiya va mineral resurslar davlat qo‘mitasi raisi

M.O. (imzo) F.I.O.

"10" yanvar 2010 y.

(Litsenziya uning ajralmas tarkibiy qismi hisoblangan zarur ilovalar mavjud bo‘lgan taqdirda haqiqiy hisoblanadi).

Republic of Uzbekistan

The State Committee of Geology and Mineral resources

LICENSE

For providing the legal rights on using the underground sites

Serial: 00 Index Number: 0035 Type of License: F1

On the basis of the task # 06/1-421 dated December 11, 2009 the Cabinet of Ministers of the Republic of Uzbekistan the License of Act of mining separation was re-registered.

This License is issued for to Paluanbaev Murat on behalf of USE "Ustyurtgas"

This license is approving the right of using the sites for trenching the underground resources (raw hydrocarbon fields)

Underground land site – GCC "Berdak - Uchsay" is located in Muynak District of the Republic of Karakalpkistan.

The underground land site's features, angular points, coordinates, topographic alignment, crossing points and etc., will be submitted in the Appendixes: The act on mining separation # 619 dated July 16, I-2004, II coordinates (confidential). On the basis of the decision of Muynak District Khokim #606/10 dated October 06, 2000 the using on the land site was guaranteed.

The License term of validity: January 10, 2045

The following is the integral part of the License:

Terms on using the land site: Appendix IV

Text Appendixes: Appendix V

Graphical Appendixes:

Date of License issue: January 10, 2010

The authority person of the License issuance:	The Chairman of the State Committee of Geology and Mining Separation
Full name:	Full name:
January 10, 2010	January 10, 2010

Ўзбекистон Республикаси Вазирлар Маҳкамаси

ЛИЦЕНЗИЯ

АВ № 202

Мазкур лицензия билан "Ўзгеобурғунефтгазқазибчиқариш" акциядорлик компаниясининг
(лицензия эгасининг тўлиқ номи)
"Устюртгаз" шуъба унитар корхонаси

га

Газ ва газ конденсатини қазиб чиқариш ва уларни сотиш
(рухсат этилган фаолият тури)

билан

шуғулланишга рухсат этилади.

Лицензия эгасининг жойлашган жойи (почта манзили): Қорақалпоғистон Республикаси, Қўнғирот шаҳри, Гарезсизлик кўчаси, 110-уй

Лицензия эгасининг солиқ тўловчи сифатидаги идентификация рақами: 201740394

Лицензия берилган сана: 2002 **й.** 3 май

Лицензиянинг амал қилиш муддати беш йил

Реестр бўйича тартиб рақами: №21

Ваколатли шахс: К.Тўлаганов
(исми шарифи, фамилияси) *(имзоси)*

М.Ў.

Лицензиянинг амал қилиш муддати 2012 **й.** 3 май **гача узайтирилди.**

Ваколатли шахс: Э.Шаисматов
(исми шарифи, фамилияси) *(имзоси)*

М.Ў.

Лицензиянинг амал қилиш муддати _____ **й.** _____ **гача узайтирилди.**

Ваколатли шахс: _____
(исми шарифи, фамилияси) *(имзоси)*

М.Ў.

Republic of Uzbekistan

The Cabinet of Ministers

Licence

AB # 202

This License gives the permission on trenching the gas and gas condensate and their selling to the JSC "Uzgeoburgunnefgazqazibchiqarish" of the USE "Ustyurtgas"

Address (postal address)of the License holder: Republic of Karakalpakistan, Kungrad town, Garezsizlik Str., 110

Identification number of the License Holder as a Tax Payer: 201740394

Date of License issue: May 03, 2002

License validity term: five years

Registration number: # 21

Authority person: K. Tulaganov Signature:

Seal

License validity term: May 03, 2012

Authority person: E. Shaismatov Signature:

Seal

License validity term:

Authority person: Signature:

Seal

Замгубернатору

O`ZBEKISTON RESPUBLIKASI
SANOATDA, KONCHILIKDA VA KOMMUNAL-MAISHIY SEKTORDA
ISHLARNING BEXATAR OLIB BORILISHINI NAZORAT QILISH
DAVLAT INSPEKSIYASI

"SANOATKONTEXNAZORAT"

КОН АЖРАТИШ ДАЛОЛАТНОМАСИ № 886

2009 йил « 16 » апрел

Тошкент шаҳри

Ўзбекистон Республикаси Саноатда, кончиликда ва коммунал-маиший секторда ишларнинг бехатар олиб борилишини назорат қилиш Давлат Инспекцияси

(«Саноатконтехназорат»)

КОН АЖРАТИШ ДАЛОЛАТНОМАСИ

2009 йил «16» апрел да Ўзбекистон Республикаси Саноатда, кончиликда ва коммунал-маиший секторда ишларнинг бехатар олиб борилишини назорат қилиш Давлат Инспекцияси томонидан "Ўзбекнефтегаз" МХК си "Ўзнефтегазқазибчиқариш" АК си "Устюртгаз" УШК си га

(ташкилот ва корхонанинг тўлиқ номи ва унинг мансублиги)

ер юзаси илова қилинаётган планда белгиланган чегараларда "Сургил-Шимолий Орол" конидан фойдали қазилма газ конденсат қазиб олиш услубида ишлатиш ва саноат йўли билан қидирув ишларини бажариш учун кон ажратмаси ажратилди.

Кон ажратмаси Қорақалпоғистон Республикаси

(республика, вилоят, туман, қишлоқ номи)

Муйноқ тумани да жойлашган.

Ер юзасида 1, 2, 3, 4, 5, 6

бурчакли пунктлар билан белгиланган кон ажратмаси проекцияси майдони Ун минг олти юз йигирм икки (14622) га ни ташкил этади.

(сўз билан ёзилади)

Кон ажратмасининг амал қилиш муддати беш (5) йил.

Мазкур далолатнома икки нусхада тузилди ва 886 тартиб рақами билан «Саноатконтехназорат» Давлат Инспекцияси реестрига киритилди.

Корхона фойдали қазилма конини қазиб олиш учун ажратилган конда қуйидагиларни бажаришга мажбурдир:

фойдали қазилмаларни қазиб олувчи корхонанинг тасдиқланган лойиҳасига, кон ишларини ривожлантириш режасига, нефт, газ ва ер ости сувлари конларини қазиб олиш лойиҳалари ва сметаларига ҳамда техникавий фойдаланиш қоидаларига мувофиқ қазиб олиш;

ажратилган кон ва унга туташиб кетган ҳудудларда барча ер усти, ер ости иншоотларини, шунингдек атроф табиий муҳитни кон ишланмаларининг зарарли таъсиридан муҳофаза қилиш;

заҳираларнинг ҳолати ва ҳаракати, фойдали қазилмаларнинг камайиши ва аралашиб кетишини ҳисобга олиш, ишланаётган (ер қаърида вақтинча консервация қилинган) ва у билан қўшни конларда фойдали қазилмалар бузилишига йўл қўймаслик;

фойдали қазилма устида жойлашган жинслардан оқилона фойдаланиши, шунингдек уларнинг жинсларни хусусиятлари ва ернинг қайта тикланиши талаблари ҳисобга олинган ҳолда жойлаштирилишини таъминлаш;

ажратилган кон устидаги ҳудудда, шунингдек фойдали қазилмалар конларига туташ майдонларда «Саноатконтехназорат» Давлат Инспекцияси рухсатисиз иморатлар қурилишига йўл қўймаслик, конда фойдаланишда улардан фойдаланиш ёки портлатиш ишлари ва ушбу конларни, ишлатишда ҳосил бўладиган кўчкиларнинг хавфи ва зарарли таъсири ёйилиши мумкин;

кон ишлари бошланишидан 15 кун олдин, бу ҳақда «Саноатконтехназорат» Давлат Инспекциясига маълум қилиш.

Агар ер ости бойликларидан фойдаланувчи бир йил давомида ер ости бойликларидан фойдаланишга киришмаса кон ажратиш далолатномаси ўз кучини йўқотади ва у «Саноатконтехназорат» Давлат Инспекциясига қайтарилиши керак.

Фойдали қазилмаларни қазувчи корхона консервация қилинганда ёки тугатилганда объект тугатилиши ёки консервация қилинишига оид ишлар тамом бўлган кунда тўлдирилган геология ва маркшейдерлик ҳужжатларининг асл нусхалари 10 кун муддатда ўзининг юқори турган ташкилотига топширилиши, маркшейдер планлари, геология хариталари ва усти очиқ конлар нусхалари эса мана шу муддатда манфаатдор корхоналарга, ташкилотларга, шу жумладан қўшни корхоналарга берилиши керак.

Корхонага берилган кон ажратмаси бошқа корхонага берилиши таъқиқланади.

Кон ажратиш далолатномаси маркшейдерлик ва геология ҳужжатларининг нусхалари олинганлиги тўғрисида манфаатдор ташкилотларнинг тилхатлари нусхалари олинганлиги тўғрисида манфаатдор ташкилотларнинг тилхатлари нусхалари билан биргаликда кон корхонаси консервация қилиниши ёки тугатилиши ҳақида далолатнома расмийлаштирилгандан кейин 15 кун муддатда «Саноатконтехназорат» Давлат Инспекциясига топширилади.

Кўрсатиб ўтилган мажбуриятлар бажарилмаганлиги учун фойдали қазилмаларни қазувчи корхона раҳбарлари ва мансабдор шахслари қонунга мувофиқ жавоб берадилар.

М.Ў.

2009 йил «16» апрел

Ўзбекистон Республикаси Саноатда, кончиликда
ва коммунал-маиший секторда ишларнинг бехатар
олиб борилишини назорат қилиш Давлат
Инспекцияси бошлиғи

И.М.Холматов

(имзо, фамилияси, исми ва отасининг исми)

Republic of Uzbekistan

“SANOATKONTEXNAZORAT”

The State Supervision Committee on monitoring of the safety works performance in the industry, mining and public service sectors

Act on mining separation #886

April 16, 2009

Tashkent city

The State Supervision Committee on monitoring of the safety works performance in the industry, mining and public service sectors

(“SANOATKONTEXNAZORAT”)

Act on mining separation

The mining was separated to NHC “Uzbekneftegaz” of JSC “Uzgeoburgunnefgazqazibchiqarish” of the USE “Ustyurtgas” in April 16, 2009, for carrying out the research and performing the industrial mining on using the “Southern Orol” mine for trenching the gas condensate deposit on the basis of the Attached Land surface Alignment on behalf of the State Supervision Committee on monitoring of the safety works performance in the industry, mining and public service sectors.

The mining deposit is located in the Republic of Karakalpakistan, Muynak District.

Land surface pointed with projection areas of 1, 2, 3, 4, 5, 6 are Fourteen thousand six hundred twenty two (14622) hectares.

Mining term of validity: five (5) years

This act is made in two copies and registered by registration #886 in the State Supervision Committee on monitoring of the safety works performance in the industry, mining and public service sectors.

The State Supervision Committee on monitoring of the safety works performance in the industry, mining and public service sectors

(“SANOATKONTEXNAZORAT”)

Act on mining separation

The mining was separated to NHC “Uzbekneftegaz” of JSC “Uzgeoburgunnefgazqazibchiqarish” of the USE “Ustyurtgas” in April 16, 2009, for carrying out the research and performing the industrial mining on using the “Southern Orol” mine for trenching the gas condensate deposit on the basis of the Attached Land surface Alignment on behalf of the State Supervision Committee on monitoring of the safety works performance in the industry, mining and public service sectors.

The mining deposit is located in the Republic of Karakalpakistan, Muynak District.

Land surface pointed with projection areas of 1, 2, 3, 4, 5, 6 are Fourteen thousand six hundred twenty two (14622) hectares.

Mining term of validity: five (5) years

This act is made in two copies and registered by registration #886 in the State Supervision Committee on monitoring of the safety works performance in the industry, mining and public service sectors.

To trench the mining deposits in the mining the following should be carried out:

To trench the mineral deposits on the basis of the Enterprise's approved project, the Development Plan, to perform the mining works, i.e., oil, gas and underground waters in accordance with the designs and estimation documents and rules of technical using.

To protect the separated mining and other neighboring areas, underground water facilities, also environment from the harmful substances of mining works.

To take into consideration the reserves movement and condition, decreasing and mixing the mineral deposits, keep out from the destruction of the acting (temporarily preserved mining) and neighboring deposits.

Properly using of the mineral deposits on the field's surface and also to place them in view of the requirements of their decrease and increase and land recovery.

To prevent the construction of the buildings and facilities near the separated mining, to use the mining and carrying out the explosive works and distribution of the landslides harm and harmful effects and without permission of the State Supervision Committee on monitoring of the safety works performance in the industry, mining and public service sectors.

Prior to mining works, the State Supervision Committee on monitoring of the safety works performance in the industry, mining and public service sectors should be notified in 15 days about it.

If the land user doesn't starts the work performance in 1 year period, the act becomes not valid and it should be returned to the State Supervision Committee on monitoring of the safety works performance in the industry, mining and public service sectors.

In 10 days' period the original documents on markshading and others filled in the date of preserving or terminating the mineral deposits should be submitted in the Executive Agency, and markshading plans, geological maps and open mining documents copies should be also submitted to the relevant authorities, organizations and neighboring enterprises.

Separated mining is prohibited to deliver to other enterprise.

The receipt on receiving the markshading and geological documents from relevant authorities and act on preserving or terminating the enterprise in 15 days' period should be submitted to the State Supervision Committee on monitoring of the safety works performance in the industry, mining and public service sectors.

For non – performance of the mentioned above liabilities, the authority persons – Director or the Manager of the Mining Enterprise should liable in accordance with acting legislation.

April 16, 2009

The Head of the State Supervision Committee on monitoring

of the safety works performance in the industry,

mining and public service sectors: I.M. Kholmatov

ЎЗБЕКИСТОН РЕСПУБЛИКАСИ

Саноатда ва кончиликда
мехнатни мехнат олиб борилишини
назорат қилиш Агентлиги

(Саноатконтехназорат)

REPUBLIC OF UZBEKISTAN

Agency
on Safety in Industry
and Mining

(ASIM)

КОН АЖРАТИШ ДАЛОЛАТНОМАСИ №619

200 4 йил « 20 » июл

Тошкент шахри

ЎЗБЕКИСТОН РЕСПУБЛИКАСИ
САНОАТДА ВА КОНЧИЛИКДА ИШЛАРНИ
БЕХАТАР ОЛИБ БОРИЛИШИНИ НАЗОРАТ ҚИЛИШ
АГЕНТЛИГИ

(«САНОАТКОНТЕХНАЗОРАТ»)

КОН АЖРАТИШ ДАЛОЛАТНОМАСИ

2004 йил «20» июл да Ўзбекистон Республикаси Саноатда ва кончиликда ишларнинг беҳатар олиб борилишини назорат қилиш Агентлиги томонидан „Ўзбекнефтегаз" МХК
„Ўзгеобурнефтегаздобыча" АК
„Устюртгаз" УДП
(ташкилот ва корхонанинг тўлиқ номи ва унинг мансублиги)
ер юзаси илова қилинаётган планда белгилинган чегараларда „Шарқий Бердах-Учсой конидан
(фойдали қазилма номи)
фойдали қазилма, газ қазиб олиш услубида
ишлатиш ва саноат йўли билан қидирув ишларини бажариш учун кон ажратмаси ажратилади.

Кон ажратмаси Қорақалпоғистон Республикаси
(республика, вилоят, туман, қишлоқ номи)
Мўйноқ тумани да жойлашган.

Ер юзасида 1, 2, 3, 4 ва 5

бурчакли пунктлар билан белгиланган кон ажратмаси проекцияси майдони 5610,0 (Беш минг олти юз ўн) га ни ташкил этади.
Кон ажратмасининг амал қилиш муддати 5 (беш) йил.

Мазкур далолатнома икки нусхада тузилди ва 619 тартиб рақами билан «Саноатконтехназорат» Агентлиги реестрига киритилади.

Корхона фойдали қазилма конини қазиб олиш учун ажратилган конда қуйдагиларни бажаришга мажбурдир:

Фойдали қазилмаларни қазиб олувчи корхонанинг тасдиқланган лойихасига кон ишларини ривожлантириш режасига, нефт, газ ва ерости сувлари конларини қазиб олиш лойихалари ва схаемаларига ҳамда техникавий фойдаланиш қоидиларига мувофиқ қазиб олиш:

Аратилган кон ва унга кетган худудларда барча ер усти, ер ости иншоатларини, шунингдек атроф табиий мухитни кон ишларининг зарарли таъсиридан муҳофаза қилиш:

Захираларнинг холати ва харакати, фойдали қазилмаларнинг камайиши ва аралашиб кетишини хисобга олиш, ишланаётган (ер қаърида вақтинча консервация қилинган) ва у билан қўшни конларда фойдали қазилмалар бузулишига йўл қўймаслик:

Фойдали қазилма устида жойлашган жинслардан оқилона фойдаланиши, шунингдек уларнинг жинслари хусусиятлари ва ернинг қайта тикланиши талаблари хисобига олинган холда жойлаштирилишини таъминлаш:

Ажратилган кон устидаги худудда, шунингдек фойдали қазилмалар конларига туташ майдонларда «Саноатконтехназорат» Агентлиги рухсатисиз иморатлар қурилишига йўл қўймаслик, конда фойдаланишда улардан фойдаланиш ёки портлаштириш ишлари ва ушбу конларни ишлатишда хосил бўладиган кўчкиларнинг хавфли ва зарарли тағсир уларга ёйилиши мумкин:

Кон ишларини бошланишидан 15 кун олдин бу ҳақда «Саноатконтехназорат» Агентлигига маҳлум қилиш.

Агар ер ости бойликларидан фойдаланувчи бир йил давомида ер ости бойликларидан фойлдаланнишга киришмаса кон ажратиш далолатномаси ўз кучини йўқотади ва у «Саноатконтехназорат» Агентлигига қайтарилиши керак.

Фойдали қазилмаларни кузатувчи корхона консервация қилинганда ёки тугатилганда объект тугатилиши ёки консервация қилинишига оид ишлар томом бўлган кунда тўлдирилган геология ва маркшейдерлик хужжатларининг асл нусхалари 10 кун муддатда ўзининг юқори турган ташкилотига топширилиши, маркшейдер планлари, геология хариталари ва усти очиқ нусхалари эса мана шу муддатда манфаатдор корхоналарга, ташқилотларга шу жумладан қўшни корхоналарга берилиши керак.

Корхонага берилган кон ажратмаси бошқа корхонага берилиши тақиқланади.

Кон ажратиш далолатномаси маркшейдерлик ва геология хужжатларининг нусхалари олинганлиги тўғрисида манфаатдор ташкилотларнинг тилхатлари нусхалари билан биргаликда кон корхонаси консервация қилиниши ёки тугатилиши хақидаги далолатнома расмийлаштирилгандан кейин 15 кун муддатда «Саноатконтехназорат» Агентлигига топширилади.

Кўрсатиб ўтилган мажбуриятлар бажарилмаганлиги учун фойдали қазилмаларни қазувчи корхона рахбарлари ва мансабдор шахслар қонунга мувофиқ жавоб берадилар.

М.Ў.

2004 йил «20» июня

Ўзбекистон Республикаси Саноатда ва кончиликда
Ишларнинг бехатар олиб борилишини назорат
Қилиш Агентлиги бош директори
Р.Т. Сапиров
(имзо, фамилияси, исми ва отасининг исми)

Republic of Uzbekistan

Agency on safety in Industrial and Mining

(ASIM)

Act on mining separation #619

July 20, 2004

Tashkent city

Republic of Uzbekistan

The Agency on monitoring of the safety works performance in the industry, mining and public service sectors

(“SANOATKONTEXNAZORAT”)

Act on mining separation

The mining was separated to NHC “Uzbekneftegaz” of JCS “Uzgeoburgunnefgazqazibchiqarish” of the USE “Ustyurtgas” in July 20, 2004, for carrying out the research and performing the industrial mining on using the “Eastern Berdak – Uchsay”” mine for trenching the gas condensate deposit on the basis of the Attached Land surface Alignment on behalf of the State Supervision Committee on monitoring of the safety works performance in the industry, mining and public service sectors.

The mining deposit is located in the Republic of Karakalpakistan, Muynak District.

Land surface pointed with projection areas of 1, 2, 3, 4 and 5 are 5610.0 (five thousand and ten)hectares.

Mining term of validity: 5 (five) years

This act is made in two copies and registered by registration #619 in the Agency on monitoring of the safety works performance in the industry, mining and public service sectors.

To trench the mining deposits in the mining the following should be carried out:

To trench the mineral deposits on the basis of the Enterprise's approved project, the Development Plan, to perform the mining works, i.e., oil, gas and underground waters in accordance with the designs and estimation documents and rules of technical using.

To protect the separated mining and other neighboring areas, underground water facilities, also environment from the harmful substances of mining works.

To take into consideration the reserves movement and condition, decreasing and mixing the mineral deposits, keep out from the destruction of the acting (temporarily preserved mining) and neighboring deposits.

Properly using of the mineral deposits on the field's surface and also to place them in view of the requirements of their decrease and increase and land recovery.

To prevent the construction of the buildings and facilities near the separated mining, to use the mining and carrying out the explosive works and distribution of the landslides harm and harmful effects and without permission of the Agency on monitoring of the safety works performance in the industry, mining and public service sectors.

Prior to mining works, the Agency on monitoring of the safety works performance in the industry, mining and public service sectors should be notified in 15 days about it.

If the land user doesn't starts the work performance in 1 year period, the act becomes not valid and it should be returned to the Agency on monitoring of the safety works performance in the industry, mining and public service sectors.

In 10 days' period the original documents on markshading and others filled in the date of preserving or terminating the mineral deposits should be submitted in the Executive Agency, and markshading plans, geological maps and open mining documents copies should be also submitted to the relevant authorities, organizations and neighboring enterprises.

Separated mining is prohibited to deliver to other enterprise.

The receipt on receiving the markshading and geological documents from relevant authorities and act on preserving or terminating the enterprise in 15 days' period should be submitted to the Agency on monitoring of the safety works performance in the industry, mining and public service sectors.

For non – performance of the mentioned above liabilities, the authority persons – Director or the Manager of the Mining Enterprise should liable in accordance with acting legislation.

July 20, 2004

The Head of the Agency on monitoring

of the safety works performance in the industry,

mining and public service sectors: R. Saidov

ЎЗБЕКИСТОН РЕСПУБЛИКАСИ
Саноатда ва кончиликда
ишларнинг бехатар олиб борилишини
назорат қилиш давлат қўмитаси

("Ўзсаноатконтехназорат"
давлат қўмитаси)

Государственный Комитет
РЕСПУБЛИКИ УЗБЕКИСТАН
по надзору за безопасным ведением
работ в промышленности и горному
надзору

(ГОСГОРТЕХНАДЗОР
РЕСПУБЛИКИ УЗБЕКИСТАН)

КОН АЖРАТИШ ДАЛОЛАТНОМАСИ № 446

1999 йил "29" ноябр

Тошкент шаҳри

Ўзбекистон Республикаси Саноатда ва кончиликда ишларнинг бехатар олиб борилишини назорат қилиш давлат қўмитаси

("Ўзсаноатконтехназорат")

КОН АЖРАТИШ ДАЛОЛАТНОМАСИ

1999 йил "29" ноябр да Ўзбекистон Республикаси Саноатда ва кончиликда ишларнинг бехатар олиб борилишини назорат қилиш давлат қўмитаси томонидан „Ўзгеонефтгазказибчикариш" АКга карашли „Устюртгаз" корхонаси га

(ташкилот ва корхонанинг тўлиқ номи ва унинг мансублиги)

ер юзаси илова қилинаётган планда белгиланган чегараларда „Урга" конларидан газ ва конденсат

(фойдали қазилма номи)

фойдали қазилмаларини қазиб олиш услубида ишлатиш ва саноат йўли билан қидирув ишларини бажариш учун кон ажратмаси ажратилади.

Кон ажратмаси Қорақалпакистан Республикаси

(республика, вилоят, туман, қишлоқ номи)

Муйнак тумани да жойлашган.

Ер юзасида 1,2,3,4,5,6 ва 7

бурчакли пунктлар билан белгиланган кон ажратмаси проекцияси майдони 10075,0 (ўн минг етмиш беш) га

(сўз билан езилади)

ни ташкил этади.

Кон ажратмасининг амал қилиш муддати чекланмаган йил.

Мазкур далолатнома икки нусхада тузилди ва _____ тартиб рақами билан "Ўзсаноатконтехназорат" давлат қўмитаси реестрига киритилди.

Корхона фойдали қазилма конини қазиб олиш учун ажратилган конда қуйидагиларни бажаришга мажбурдир:

фойдали қазилмаларни қазиб олувчи корхонанинг тасдиқланган лойиҳасига, кон ишларини ривожлантириш режасига, нефт, газ ва ерости сувлари конларини қазиб олиш лойиҳалари ва схемаларига ҳамда техникавий фойдаланиш қоидаларига мувофиқ қазиб олиш;

ажратилган кон ва унга туташиб кетган ҳудудларда барча ер усти, ер ости иншоотларини, шунингдек атроф табиий муҳитни кон ишланмаларининг зарарли таъсиридан муҳофаза қилиш;

заҳираларнинг ҳолати ва ҳаракати, фойдали қазилмаларнинг камайиши ва аралашиб кетишини ҳисобга олиш, ишланаётган (ер қаърида вақтинча консервация қилинган) ва у билан қўшни конларда фойдали қазилмалар бузилишига йўл қўймаслик;

фойдали қазилма устида жойлашган жинслардан оқилона фойдаланиши, шунингдек уларнинг жинсларни хусусиятлари ва ернинг қайта тикланиши талаблари ҳисобга олинган ҳолда жойлаштирилишини таъминлаш;

ажратилган кон устидаги ҳудудда, шунингдек фойдали қазилмалар конларига туташ майдонларда "Ўзсаноатконтехназорат" давлат қўмитаси рухсатисиз иморатлар қурилишига йўл қўймаслик, конда фойдаланишда улардан фойдаланиш ёки портлатиш ишлари ва ушбу конларни ишлатишда ҳосил бўладиган кўчкиларнинг хавфли ва зарарли таъсири уларга ёйилиши мумкин;

кон ишлари бошланишидан 15 кун олдин бу хақда "Ўзсаноатконтехназорат" давлат қўмитасига маълум қилиш.

Агар ер ости бойликларидан фойдаланувчи бир йил давомида ер ости бойликларидан фойдаланишга киришмаса кон ажратиш далолатномаси ўз кучини йўқотади ва у "Ўзсаноатконтехназорат" давлат қўмитасига қайтарилиши керак.

Фойдали қазилмаларни қазувчи корхона консервация қилинганда ёки тугатилганда объект тугатилиши ёки консервация қилинишига оид ишлар тамом бўлган кунда тўлдирилган геология ва маркшейдерлик ҳужжатларининг асл нусхалари 10 кун муддатда ўзининг юқори турган ташкилотига топширилиши, маркшейдер планлари, геология хариталари ва усти очиқ конлар нусхалари эса мана шу муддатда манфаатдор корхоналарга, ташкилотларга, шу жумладан қўшни корхоналарга берилиши керак.

Корхонага берилган кон ажратмаси бошқа корхонага берилиши тақиқланади.

Кон ажратиш далолатномаси маркшейдерлик ва геология ҳужжатларининг нусхалари олинганлиги тўғрисида манфаатдор ташкилотларнинг тилхатлари нусхалари билан биргаликда кон корхонаси консервация қилиниши ёки тугатилиши ҳақидаги далолатнома расмийлаштирилгандан кейин 15 кун муддатда "Ўзсаноатконтехназорат" давлат қўмитасига топширилади.

Кўрсатиб ўтилган мажбуриятлар бажарилмаганлиги учун фойдали қазилмаларни қазувчи корхона раҳбарлари ва мансабдор шахслари қонунга мувофиқ жавоб берадилар.

1999 йил 29 ноября

Ўзбекистон Республикаси
Саноатда ва кончиликда ишларнинг
бехатар олиб борилишини назорат
қилиш давлат қўмитаси раиси

А.Г.Ахмедбаев
(имзо, фамилияси, исми ва отасининг исми)

Republic of Uzbekistan

“UZSANOATKONTEXNAZORAT”

The State Supervision Committee on monitoring of the safety works performance in the industry, mining and public service sectors

Act on mining separation #445

November 29, 1999

Tashkent city

Republic of Uzbekistan

The State Supervision Committee on monitoring of the safety works performance in the industry, mining and public service sectors

(“UZSANOATKONTEXNAZORAT”)

Act on mining separation

The mining was separated to JCS “Uzneftegazibchiqarish” of the USE “Ustyrtgas” in April 16, 1999, for carrying out the research and performing the industrial mining on using the “Urga” mine for trenching the gas condensate deposit on the basis of the Attached Land surface Alignment on behalf of the State Supervision Committee on monitoring of the safety works performance in the industry, mining and public service sectors.

The mining deposit is located in the Republic of Karakalpakistan, Muynak District.

Land surface pointed with projection areas of 1, 2, 3, 4, 5, 6 and 7 are 10075.0 (ten thousand and seventy five) hectares.

Mining term of validity: not limited

This act is made in two copies and registered by registration in the State Supervision Committee “Uzsanoatkontexnazorat”.

To trench the mining deposits in the mining the following should be carried out:

To trench the mineral deposits on the basis of the Enterprise's approved project, the Development Plan, to perform the mining works, i.e., oil, gas and underground waters in accordance with the designs and estimation documents and rules of technical using.

To protect the separated mining and other neighboring areas, underground water facilities, also environment from the harmful substances of mining works.

To take into consideration the reserves movement and condition, decreasing and mixing the mineral deposits, keep out from the destruction of the acting (temporarily preserved mining) and neighboring deposits.

Properly using of the mineral deposits on the field's surface and also to place them in view of the requirements of their decrease and increase and land recovery.

To prevent the construction of the buildings and facilities near the separated mining, to use the mining and carrying out the explosive works and distribution of the landslides harm and harmful effects and without permission of the State Supervision Committee on monitoring of the safety works performance in the industry, mining and public service sectors –"Uzsanoatkontexnazorat".

Prior to mining works, the State Supervision Committee on monitoring of the safety works performance in the industry, mining and public service sectors "Uzsanoatkontexnazorat" should be notified in 15 days about it.

If the land user doesn't starts the work performance in 1 year period, the act becomes not valid and it should be returned to the State Supervision Committee on monitoring of the safety works performance in the industry, mining and public service sectors "Uzsanoatkontexnazorat".

In 10 days' period the original documents on markshading and others filled in the date of preserving or terminating the mineral deposits should be submitted in the Executive Agency, and markshading plans, geological maps and open mining documents copies should be also submitted to the relevant authorities, organizations and neighboring enterprises.

Separated mining is prohibited to deliver to other enterprise.

The receipt on receiving the markshading and geological documents from relevant authorities and act on preserving or terminating the enterprise in 15 days' period should be submitted to the State Supervision Committee on monitoring of the safety works performance in the industry, mining and public service sectors.

For non – performance of the mentioned above liabilities, the authority persons – Director or the Manager of the Mining Enterprise should liable in accordance with acting legislation.

November 29, 1999

The Head of the State Supervision Committee on monitoring of the safety works performance in the industry, mining and public service sectors "Uzsanoatkontexnazorat": A.G. Akhmedbaev.

STATE COMMITTEE OF THE REPUBLIC OF UZBEKISTAN ON NATURE PROTECTION

SYSTEM OF ENVIRONMENTAL CERTIFICATION

 # 013750

THE MAIN ENVIRONMENTAL GOVERNANCE CERTIFICATION, STANDARDIZATION AND REGULATION

ECOLOGICAL CERTIFICATE

Registration number: EST.O'z. M.128.13750
Date of issue: July 15, 2010
Valid till: July 15, 2013

This certificate certifies that properly identified the object environmental certification of technological process of mining of the natural gas and gas – condensate at the production site # 2

its regulatory and methodological base complies with the following regulatory and legislation GOST 17.2.4.02-81

Information about the certificate holder USE "USTYURTGAZ"

Republic of Karakalpakstan, Kungrad town, Garezsizlik Str., 110

Telephone: Fax:

Data on the environmental certification of the required criteria of GOST 17.2.4.02-81

Measurement Minutes # 27 on 08.07.10 year, as per the audit protocol number 1372.

Note: The Body of Systems for environmental certification issued the certificate, may revoke the certificate if the recipient of this certificate does not fulfill the requirements for compliance with which it was issued.

Head of certifying body: N.M. Karimov

EXPERT - AUDIT REPORT

The number of 1372 to "Ekocertificate" for the number «EST.O 'zM128 13750" issued by "General Administration of environmental certification, standardization and regulation" at the State Committee of the RUz on July 15, 2010.

Name of organization or individual applicant	USE «Ustyurtgas»
Address	Rk, Kungrad District, Kungrad town, Gargezsizlik Str., 110
Responsible Officer for environmental issues	Process Engineer of PHE S. Artikov
The object of environmental certification	The technological process for the extraction of natural gas and condensate at the production site of # 2 (CGTU "Surgil")
Substances having a negative impact on the environment	Emissions of pollutants into the air, waste water, as well as production and consumption waste containing hazardous substances.
Signs of environmental safety	GOST 17.2.4.02-81, GOST 17.2.3.02-78, O'z DSt 948:1999/ TSt 39.0-02:2004 Not exceed the established norm allowable emissions, waste and wastewater containing hazardous substances that pollute the environment.
Inspection – monitoring supervision (time of conducting)	Once a year
Established mandatory conditions	Strict compliance with the regulations of the technological and manual equipment. Timely delivery of preventive maintenance equipment. Compliance with the fuel tank leak, drain the fuel only for pressurized fuel line. Anti-corrosion coating and painting equipment and pipelines. Create appropriate conditions for environmental standards in production, transportation, receiving, preparation, shipment, storage and sale of products and wastes. Follow the environmental requirements established in the regulations. In the future, set the PGO and the PSU equipment for reducing the emissions of harmful substances into the air. Do not have a negative impact on the environment. Control over the sources of emissions, waste and wastewater management, air quality of the air operations area. Rational use of natural resources.

Head of KKgosekocertificate R.M. Palymbetov
Head of USE «Ustyurtgas» M. P. Paluanbaev
Responsible Officer for environmental issues
Process Engineer of PHE S.K. Artikov

STATE COMMITTEE OF THE REPUBLIC OF UZBEKISTAN ON NATURE PROTECTION

SYSTEM OF ENVIRONMENTAL CERTIFICATION

 # 013751

THE MAIN ENVIRONMENTAL GOVERNANCE CERTIFICATION, STANDARDIZATION AND REGULATION

ECOLOGICAL CERTIFICATE

Registration number: EST.O'z. M.128.13751
Date of issue: July 15, 2010
Valid till: July 15, 2013

This certificate certifies that properly identified the object environmental certification of technological process of mining of the natural gas and gas – condensate at the production site # 3

its regulatory and methodological base complies with the following regulatory and legislation GOST 17.2.4.02-81

Information about the certificate holder USE "USTYURTGAZ"

Republic of Karakalpakstan, Kungrad town, Garezsizlik Str., 110

Telephone: Fax:

Data on the environmental certification of the required criteria of GOST 17.2.4.02-81

Measurement Minutes # 28 on 08.07.1910, as per the audit protocol number 1373.

Note: The Body of Systems for environmental certification issued the certificate, may revoke the certificate if the recipient of this certificate does not fulfill the requirements for compliance with which it was issued.

Head of certifying body: N.M. Karimov

EXPERT - AUDIT REPORT

The number of 1373 to " Ekocertificate " for the number «EST.O 'zM128 13751" issued by "General Administration of environmental certification, standardization and regulation" at the State Committee of the RU on July 15, 2010.

Name of organization or individual applicant	USE «Ustyurtgas»
Address	Rk, Kungrad District, Kungrad town, Gargezsizlik Str., 110
Responsible Officer for environmental issues	Process Engineer of PHE S. Artikov
The object of environmental certification	The technological process for the extraction of natural gas and condensate at the production site of # 3 (CGTU "Eastern Berdak")
Substances having a negative impact on the environment	Emissions of pollutants into the air, waste water, as well as production and consumption waste containing hazardous substances.
Signs of environmental safety	GOST 17.2.4.02-81, GOST 17.2.3.02-78, O'z DSt 948:1999/ TSt 39/0-02:2004 Not exceed the established norm allowable emissions, waste and wastewater containing hazardous substances that pollute the environment.
Inspection – monitoring supervision (time of conducting)	Once a year
Established mandatory conditions	Strict compliance with the regulations of the technological and manual equipment. Timely delivery of preventive maintenance equipment. Compliance with the fuel tank leak, drain the fuel only for pressurized fuel line. Anti-corrosion coating and painting equipment and pipelines. Create appropriate conditions for environmental standards in production, transportation, receiving, preparation, shipment, storage and sale of products and wastes. Follow the environmental requirements established in the regulations. In the future, set the PGO and the PSU equipment for reducing the emissions of harmful substances into the air. Do not have a negative impact on the environment. Control over the sources of emissions, waste and wastewater management, air quality of the air operations area. Rational use of natural resources.

Head of KKgosekocertificate R.M. Palymbetov
Head of USE «Ustyurtgas» M. P. Paluanbaev
Responsible Officer for environmental issues
Process Engineer of PHE S.K. Artikov

STATE COMMITTEE OF THE REPUBLIC OF UZBEKISTAN ON NATURE PROTECTION

SYSTEM OF ENVIRONMENTAL CERTIFICATION

 # 013752

THE MAIN ENVIRONMENTAL GOVERNANCE CERTIFICATION, STANDARDIZATION AND REGULATION

ECOLOGICAL CERTIFICATE

Registration number: EST.O'z. M.128.13752
Date of issue: July 15, 2010
Valid till: July 15, 2011

This certificate certifies that properly identified the object environmental certification of working process natural on transport, acceptance, storage and delivery of gas-condensate at the production site # 4

its regulatory and methodological base complies with the following regulatory and legislation GOST 17.2.4.02-81

Information about the certificate holder USE "USTYURTGAZ"

Republic of Karakalpakstan, Kungrad town, Garezsizlik Str., 110

Telephone: Fax:

Data on the environmental certification of the required criteria of GOST 17.2.4.02-81

Measurement Minutes # 29 on 08.07.10 year, as per the audit protocol number 1374.

Note: The Body of Systems for environmental certification issued the certificate, may revoke the certificate if the recipient of this certificate does not fulfill the requirements for compliance with which it was issued.

Head of certifying body: N.M. Karimov

EXPERT - AUDIT REPORT

The number of 1374 to " Ekocertificate " for the number «EST.O 'zM128 13752" issued by "General Administration of environmental certification, standardization and regulation" at the State Committee of the RU on July 15, 2010.

Name of organization or individual applicant	USE «Ustyurtgas»
Address	Rk, Kungrad District, Kungrad town, Gargezsizlik Str., 110
Responsible Officer for environmental issues	Process Engineer of PHE S. Artikov
The object of environmental certification	The technological process for the extraction of natural gas and condensate at the production site of # 4 (NOE "Akcholak")
Substances having a negative impact on the environment	Emissions of pollutants into the air, waste water, as well as production and consumption waste containing hazardous substances.
Signs of environmental safety	GOST 17.2.4.02-81, GOST 17.2.3.02-78, O'z DSt 948:1999/ TSt 39/0-02:2004 Not exceed the established norm allowable emissions, waste and wastewater containing hazardous substances that pollute the environment.
Inspection – monitoring supervision (time of conducting)	Once a year
Established mandatory conditions	Strict compliance with the regulations of the technological and manual equipment. Timely delivery of preventive maintenance equipment. Compliance with the fuel tank leak, drain the fuel only for pressurized fuel line. Anti-corrosion coating and painting equipment and pipelines. Create appropriate conditions for environmental standards in production, transportation, receiving, preparation, shipment, storage and sale of products and wastes. Follow the environmental requirements established in the regulations. In the future, set the PGO and the PSU equipment for reducing the emissions of harmful substances into the air. Do not have a negative impact on the environment. Control over the sources of emissions, waste and wastewater management, air quality of the air operations area. Rational use of natural resources.

Head of KKgosekocertificate R.M. Palymbetov
Head of USE «Ustyurtgas» M. P. Paluanbaev
Responsible Officer for environmental issues
Process Engineer of PHE S.K. Artikov

ЎЗБЕКИСТОН РЕСПУБЛИКАСИ
ПРЕЗИДЕНТИНИНГ

ҚАРОРИ

ПОСТАНОВЛЕНИЕ

ПРЕЗИДЕНТА
РЕСПУБЛИКИ УЗБЕКИСТАН

200 йил «____» _____ № III-797 «18» февраля 2008 г.

Об организации работ по комплексному обустройству месторождения Сургиль

В целях организации производства полимерной продукции за счет углубленной переработки природного газа с извлечением ценных компонентов, дальнейшего расширения сырьевой и производственной базы нефтехимической отрасли и начала реализации проекта по строительству Устюртского газохимического комплекса:

1. Принять к сведению, что:

Государственной комиссией по запасам полезных ископаемых при Государственном комитете Республики Узбекистан по геологии и минеральным ресурсам утверждены запасы месторождения Сургиль;

утверждено предварительное технико-экономическое обоснование проекта «Комплексное обустройство месторождения Сургиль с извлечением ценных компонентов» предварительной стоимостью 1,84 млрд. долларов, годовой мощностью по переработке 4,0 млрд.куб.м природного газа и производству 362 тыс.тонн полиэтилена, 83 тыс.тонн полипропилена и 3,7 млрд.куб.м товарного природного газа;

создан Консорциум корейских компаний в составе Корейской газовой корпорации, «Lotte Daesan Petrochemical Corporation», «LG International Corporation», «SK Gas и STX Energy»;

для реализации проекта между НХК «Узбекнефтегаз» и Консорциумом корейских компаний на территории Республики Узбекистан будет образовано предприятие с иностранными инвестициями - резидент Республики Узбекистан, с уставным фондом, эквивалентным не менее 600 млн. долларов, с равным распределением долей, по 50 процентов, между учредителями, формируемым поэтапно в течение трех лет.

2. Министерству внешних экономических связей, инвестиций и торговли Республики Узбекистан совместно с НХК «Узбекнефтегаз» в двухмесячный срок заключить в установленном порядке с Консорциумом корейских компаний Инвестиционный договор, предусматривающий в том числе взаимные обязательства сторон и гарантии их исполнения, порядок осуществления контроля за движением средств на счетах совместного предприятия, а также за целевым и эффективным расходованием средств совместного предприятия в инвестиционный период.

3. НХК «Узбекнефтегаз» в срок до 1 октября 2008 года разработать технико-экономическое обоснование проекта в соответствии с действующим законодательством Республики Узбекистан и международными требованиями, предъявляемыми при организации проектного финансирования и привлечения иностранных заемных средств, и внести в установленном порядке на утверждение в Кабинет Министров Республики Узбекистан.

4. Совету Министров Республики Каракалпакстан в месячный срок после регистрации совместного предприятия произвести отвод земель под строительство объектов, включая газовые скважины, прокладку трубопроводов и соответствующих инженерных коммуникаций, в соответствии с представленными совместным предприятием необходимыми материалами.

5. Разрешить совместному предприятию, до окончательного утверждения ТЭО проекта, осуществлять обустройство скважин на месторождении Сургиль, строительство объектов внешней инфраструктуры и инженерных коммуникаций, включая земляные работы по «нулевому циклу», с параллельным проектированием согласно рабочим чертежам и финансированием их по фактически выполненным объемам работ.

6 - 7. Секретно.

8. Кабинету Министров Республики Узбекистан выдать совместному предприятию в установленном порядке лицензию на добычу, переработку и реализацию газа и газового конденсата, а также на проектирование, строительство и эксплуатацию газопровода и газоконденсатопровода.

9. Государственному комитету Республики Узбекистан по геологии и минеральным ресурсам выдать совместному предприятию в установленном порядке лицензию на право пользования участками недр для добычи полезных ископаемых на месторождении Сургиль.

10. Узбекскому агентству связи и информатизации по обращениям совместного предприятия, его подрядчиков и субподрядчиков выдавать в установленном порядке разрешения на использование радиоэлектронных средств связи и высокочастотных устройств в рамках реализации проекта.

11. Освободить совместное предприятие от уплаты:

таможенных платежей (за исключением сборов за таможенное оформление) в период строительства, подготовки и освоения производства на ввозимое оборудование и материалы согласно перечням, утверждаемым Кабинетом Министров Республики Узбекистан, а также налога на добавленную стоимость в части выполняемых в рамках проекта иностранными компаниями объемов работ и услуг;

налога на прибыль, налога на имущество и налога на благоустройство и развитие социальной инфраструктуры сроком на десять лет с начала производства продукции на Устюртском ГХК, но не более срока возврата прямых инвестиций Консорциума.

12. Министерству иностранных дел Республики Узбекистан по заявкам совместного предприятия, подтверждаемым НХК «Узбекнефтегаз», обеспечить в установленном порядке оформление въездных виз иностранным специалистам,

принимающим участие в реализации проекта, без взимания консульских и иных сборов.

13. Министерству внутренних дел Республики Узбекистан по заявкам совместного предприятия, подтверждаемым НХК «Узбекнефтегаз», обеспечить в установленном порядке оформление, выдачу и продление многократных виз, а также временную прописку и продление временной прописки по месту временного проживания персоналу иностранных компаний, участвующих в реализации проекта, без уплаты государственной пошлины.

14. Министерству труда и социальной защиты населения Республики Узбекистан обеспечить в установленном порядке выдачу совместному предприятию разрешения на привлечение в Республику Узбекистан иностранной рабочей силы по профильным специальностям, а также по его заявкам - выдачу (продление) подтверждений иностранным гражданам на право трудовой деятельности на территории Республики Узбекистан.

15. Контроль за исполнением настоящего постановления возложить на Премьер-министра Республики Узбекистан Мирзиёева Ш.М.

Президент
Республики Узбекистан

И. Каримов

город Ташкент

ЎЗБЕКИСТОН РЕСПУБЛИКАСИ
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для реализации проекта между НХК «Узбекнефтегаз» и Консорциумом корейских компаний на территории Республики Узбекистан будет образовано предприятие с иностранными инвестициями - резидент Республики Узбекистан, с уставным фондом, эквивалентным не менее 600 млн. долларов, с равным распределением долей, по 50 процентов, между учредителями, формируемым поэтапно в течение трех лет.

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налога на прибыль, налога на имущество и налога на благоустройство и развитие социальной инфраструктуры сроком на десять лет с начала производства продукции на Устюртском ГХК, но не более срока возврата прямых инвестиций Консорциума.

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принимающим участие в реализации проекта, без взимания консульских и иных сборов.

13. Министерству внутренних дел Республики Узбекистан по заявкам совместного предприятия, подтверждаемым НХК «Узбекнефтегаз», обеспечить в установленном порядке оформление, выдачу и продление многократных виз, а также временную прописку и продление временной прописки по месту временного проживания персоналу иностранных компаний, участвующих в реализации проекта, без уплаты государственной пошлины.

14. Министерству труда и социальной защиты населения Республики Узбекистан обеспечить в установленном порядке выдачу совместному предприятию разрешения на привлечение в Республику Узбекистан иностранной рабочей силы по профильным специальностям, а также по его заявкам - выдачу (продление) подтверждений иностранным гражданам на право трудовой деятельности на территории Республики Узбекистан.

15. Контроль за исполнением настоящего постановления возложить на Премьер-министра Республики Узбекистан Мирзиёева Ш.М.

Президент
Республики Узбекистан

И. Каримов

город Ташкент

UZBEKNEFTEGAZ

27.02.2008 № 10-8-25/1

President
KOGAS
Mr. Soo-Ho, Lee

Dear Mr. Soo-Ho, Lee,

First of all let me express to you my gratitude for your fruitful cooperation between our companies for the implementation of the project for construction of the Ustyurt Gas Chemical Complex on the basis of Surgil field.

Hereby we are forwarding you the English copy of the Decree of the President of the Republic of Uzbekistan #PP-797 dated 18th February 2008 issued for the implementation of the project and creating Joint Venture between NHC "Uzbekneftegaz" and the Korean Consortium.

Articles 6 and 7 of the above mentioned Presidential Decree will be provided in Tashkent in established order to the authorized representative of the Korean Consortium only by hand carry.

The contents of the English copy of the articles 6 and 7, which were provided to KOGAS representative mr.Kim, Og Gyu, are correct and exactly translated from the original version.

With the hope for the further fruitful cooperation.

Attachment: Decree of the President of the Republic of Uzbekistan #PP-797 dated 18th February 2008 on 3 pages

Sincerely,

Sh. Majitov
First deputy Chairman

"O`zbekneftgaz" Milliy Holding Kompaniyasi
O'zbekiston Respublikasi, Toshkent sh.
Ohunboboyev ko`chasi, 21
tel:(998-71) 136-02-10
faks:(998-71) 136-77-71

"Uzbekneftegaz" National Holding Company
21 Ahunbabaev str., Tashkent, Uzbekistan
tel:(998-71) 136-02-10
fax:(998-71) 136-77-71

DECREE OF THE PRESIDENT OF THE REPUBLIC OF UZBEKISTAN

№PP-797 dated February 18th 2008

For the organization of works on complex development of Surgil field

For the purpose of the organization of production of polymers by deep processing of natural gas with extraction of valuable components, the further expansion of feedstock and production basis of petrochemical industry and the start of implementation of the project for construction of Ustyurt Gas Chemical Complex:

1. To take into account, that

By the State commission for reserves of minerals at the State Committee of the Republic of Uzbekistan for Geology and Mineral Resources the reserves of the Surgil field were approved;

The Preliminary Feasibility Study of the project "Complex development of Surgil field with extraction of valuable components" with the preliminary cost of 1,84 billion US dollars, annual capacity on processing of 4,0 bcm of natural gas and production of 362 thousand tons of polyethylene, 83 thousand tons of polypropylene and 3,7 bcm of sales gas was approved;

There was established the Consortium of the Korean companies consisting of the Korea Gas Corporation, Lotte Daesan Petrochemical Corporation, LG International Corporation, SK Gas and STX Energy ;

For implementation of the project between NHC "Uzbekneftegaz" and the Consortium of the Korean companies on the territory of the Republic of Uzbekistan will be formed the enterprise with foreign investments - the resident of the Republic of Uzbekistan, with the charter fund equivalent to not less than 600 million US dollars, with equal distribution of shares, by 50 percent, between the founders, which will be formed stage by stage within three years.

2. Ministry of Foreign Economic Relations Investments and Trade of the Republic of Uzbekistan together with NHC "Uzbekneftegaz" within two month period to sign in established order with the Consortium of the Korean companies the Investment agreement, including mutual obligations of the parties and guarantees of their execution, the procedure of the control over movement of means on accounts of Joint Venture, and also for purposely and effective spending of means of Joint Venture during the investment period.

3. NHC "Uzbekneftegaz" until 1st October, 2008 to develop the Feasibility Study of the project according to the current legislation of the Republic of Uzbekistan and international standards, required for the organization of the project financing and attraction of foreign loans, and submit in established order to the Cabinet of Ministries of the Republic of Uzbekistan.

4. The Cabinet of Ministers of the Republic of Karakalpakstan within one month period after registration of the Joint Venture allot lands for construction of the facilities including gas wells, installation of pipelines and relevant engineering communications according to the submitted by the Joint Venture necessary materials.

5. Permit to the Joint Venture, until the final approval of the FS of the project, to construct wells on the Surgil field, construction of the objects of external infrastructure and engineering communications, including construction site preparation, with parallel designing according to working drawings and their financing on actually executed amounts of works.

6-7. Confidential.

8. The Cabinet of Ministries of the Republic of Uzbekistan to issue to the Joint Venture in established order the license for development, processing and sales of gas and gas condensate, and also for designing, construction and operation of gas and condensate pipelines.

9. The State Committee of the Republic of Uzbekistan for Geology and Mineral Resources to issue to the Joint Venture in established order license for the right of use of subsoil for extraction of minerals on the Surgil field.

10. Uzbek Agency for communication and information, upon request from the JV, its contractors and sub-contractors to provide in established order permissions to use radio electronic means of communication and high frequency devices within the framework of Project.

11. Exempt the Joint Venture from the payment of:

customs duties (except for gathering for customs registration) during construction, preparation and start of production on the imported equipment and materials according to the lists approved by the Cabinet Ministry of the Republic of Uzbekistan, and also from value added tax (VAT) for works and services carried out by the foreign companies within the frame of the project;

income tax, property tax and tax on development of social infrastructure for the period of ten years from the beginning of production on Ustyurt GCC, but not more than period of return of direct investments of the Consortium.

12. Ministry for Foreign Affairs of the Republic of Uzbekistan by the requests of Joint Venture confirmed by NHC "Uzbekneftegaz". provide in established order issuing of entry visas to the foreign specialists, participating in the realization of the project, without consular and other fees.

13. Ministry of Internal Affairs of the Republic of Uzbekistan by the requests of the Joint Venture confirmed by NHC "Uzbekneftegaz", provide in established order registration, issuing and extension of multiple visas, and also temporary registration and extension of temporary registration by temporary residing place to the personnel of the foreign companies participating in realization of the project, without payment of the state fee.

14. Ministry of Labor and Social Protection of the population of the Republic of Uzbekistan provide in established order to the Joint Venture permission to attract to the Republic of Uzbekistan of foreign labor force by profile specialties, and also by its request – issue (extension) of approvals for foreign citizens on the right of labor activity on the territory of the Republic of Uzbekistan.

15. To assign the control over the execution of the Presidential Decree to the Prime-minister of the Republic of Uzbekistan Mirziyoyev. Sh.M.

The President

of the Republic of Uzbekistan I. Karimov

Unofficial translation

Appendix E. Public Consultation and Disclosure Plan

E.1. Introduction

E.1.1. Overview

The Uzbek-Korean Joint Venture (JV) "Uz-Kor Gas Chemical" LLC (hereafter referred to as 'Uz-Kor') is undertaking the development of facilities for the production of polyethylene and polypropylene primarily utilising gas from the Surgil gas field (the 'Surgil Field') in the semi-autonomous Karakalpakstan region of the Republic of Uzbekistan (the 'Project').

The Project includes among other things, the development, production and transportation of hydrocarbons from the Surgil Field, the design, construction and operation and maintenance of a gas chemical complex to be located at Akchalak on the Ustyurt Plateau and the sale (including export) of processed gas, condensate and petrochemical products.

Uz-Kor has commissioned Mott MacDonald Ltd (MML) to act as the International Environmental Consultant (IEC) to conduct an international standard environmental and social impact assessment (ESIA) and associated Environmental and Social Management Plan (ESMP) of the development to support obtaining international finance for the Project. This work builds upon the national environmental assessment process which has been contracted separately by Uz-Kor.

This Public Consultation and Disclosure Plan (PCDP) was originally produced in May 2009 to guide the public consultation and disclosure activities to be undertaken by the Project for the purpose of informing the ESIA process and to ensure its quality, comprehensiveness and effectiveness.

This PCDP was updated in June 2011 towards the end of the ESIA process and to reflect the status of the Project at that time and to specify public consultation and disclosure activities and mechanisms that continue beyond the ESIA process throughout the lifecycle of the Project.

This report is a stand alone document that is also presented as a component of the ESIA documentation. The PCDP has and will continue to be implemented by MML and Uz-Kor in accordance with the division of responsibilities specified in Section E.7.

E.1.2. PCDP Purpose, Objectives and Principles

Early and ongoing consultation, disclosure and meaningful stakeholder engagement is a key requirement for projects financed by the ADB and under the Equator Principles. The ESIA will be informed by the outcomes of consultation activities that will be guided by the PCDP initially produced for the Project at the outset of the ESIA process (May 2009) and updated subsequently.

The Project PCDP has been designed to guide public consultation and disclosure activities up to the completion of the ESIA Report and through the construction and operational phases of the project. It is a strategic document for planning meaningful and appropriate consultation with stakeholders that will be periodically updated as the Project progresses. Stakeholders are defined as persons and entities who are interested in, are affected by, or can affect the outcome of the Project. Specific objectives of the PCDP are to provide a consultation strategy for the Project to:

- Ensure all legal and international finance requirements related to consultation are addressed;
- Involve a full range of stakeholders in the planning of the project to improve the acceptability of the project design, implementation and monitoring;

- Encourage an open dialogue with local neighbouring communities and especially project affected persons where the project is located;
- Keep all interested and affected stakeholders informed of project progress; and
- Provide a grievance mechanism for Project Affected Peoples (PAPs) to raise complaints that are appropriately addressed by the Project.

The PCDP is underpinned by the principles that community engagement should be free of external manipulation, interference, coercion and intimidation and conducted on the basis of timely, relevant, understandable and accessible information. Consultation activities should always be well planned and based on principles of respectful and meaningful dialogue.

E.1.3. Document Structure

This PCDP is organised as follows:

- Section C.1 – Introduction;
- Section C.2 – Project Description and Location;
- Section C.3 – Consultation and Disclosure Requirements;
- Section C.4 – Project Stakeholders;
- Section C.5 – Public Consultation and Disclosure Implementation Programme;
- Section C.6 – Project grievance redress Mechanisms;
- Section C.7 – Roles, Responsibilities and Resources; and
- Section C.8 – Reporting.

E.2. Project Description and Location

E.2.1. Overview of Project

The aim of the Project is to contribute to the broader development goals of the Republic of Uzbekistan through the realisation of:

- The expansion of the Surgil Field for the extraction of valuable components from natural gas; and
- Gas processing with the purpose of producing gas, gas condensate and establishment of polyethylene and polypropylene production for use and export.

The development of the Surgil Field has progressed to date under the responsibility of Ustyurtgaz (UG), a subsidiary of Uzbekneftegaz (UNG), the state-owned holding company of Uzbekistan's oil and gas industry. The Surgil Field ownership will transfer from UG to Uz-Kor with the realisation of the Project. Much of the Surgil Field infrastructure, including a fully operational Central Gas Treatment Unit (CGTU) constructed in 2007, is already in existence. At March 2011, the Surgil Field included 28 operational wells, with drilling activities being undertaken at a further ten well sites.

The proposed Project intends to develop the Surgil Field to a total of 133 wells between 2007 and 2025. Gas from the Surgil Field wells will be transferred to the existing Surgil CGTU (either via the Gas Gathering Stations or routed directly) where hydrocarbon condensate and water is removed from the gas stream. The Surgil Field is anticipated to have a production life of approximately 40 years.

A new processing facility, the Ustyurt Gas Chemical Complex (UGCC) will be designed to receive natural gas and un-stabilised condensate via pipelines from the Surgil Field. The pipelines will also connect to other existing fields nearby to the Surgil Field although these other fields do not form part of the Project scope. The natural gas and un-stabilised condensate received by the UGCC will be processed to form high-density polyethylene (HDPE) and polypropylene (PP). Sales gas will also be final products from the UGCC for onward sale to third parties. The UGCC is anticipated to come into operation in late 2014 / early 2015.

The UGCC site will be located approximately 115 km away from the Surgil Field and occupy an area of undeveloped land located on the Ustyurt Plateau. The nearest settlement to the UGCC site is Kyrkkyz / Akchalak (hereafter referred to as Akchalak), located approximately 5 km to the south west. Approximately 10 km south-east of the UGCC site and adjacent to the El'abad settlement is the Kungrad Soda Plant.

The Project ESIA scope includes the construction and operation of below ground pipelines for the transfer of gas and condensate from the Surgil Field and other fields to the UGCC. An operational works settlement is planned at the Surgil Field and a new settlement will be developed at the site of the UGCC.

E.2.2. Project Location

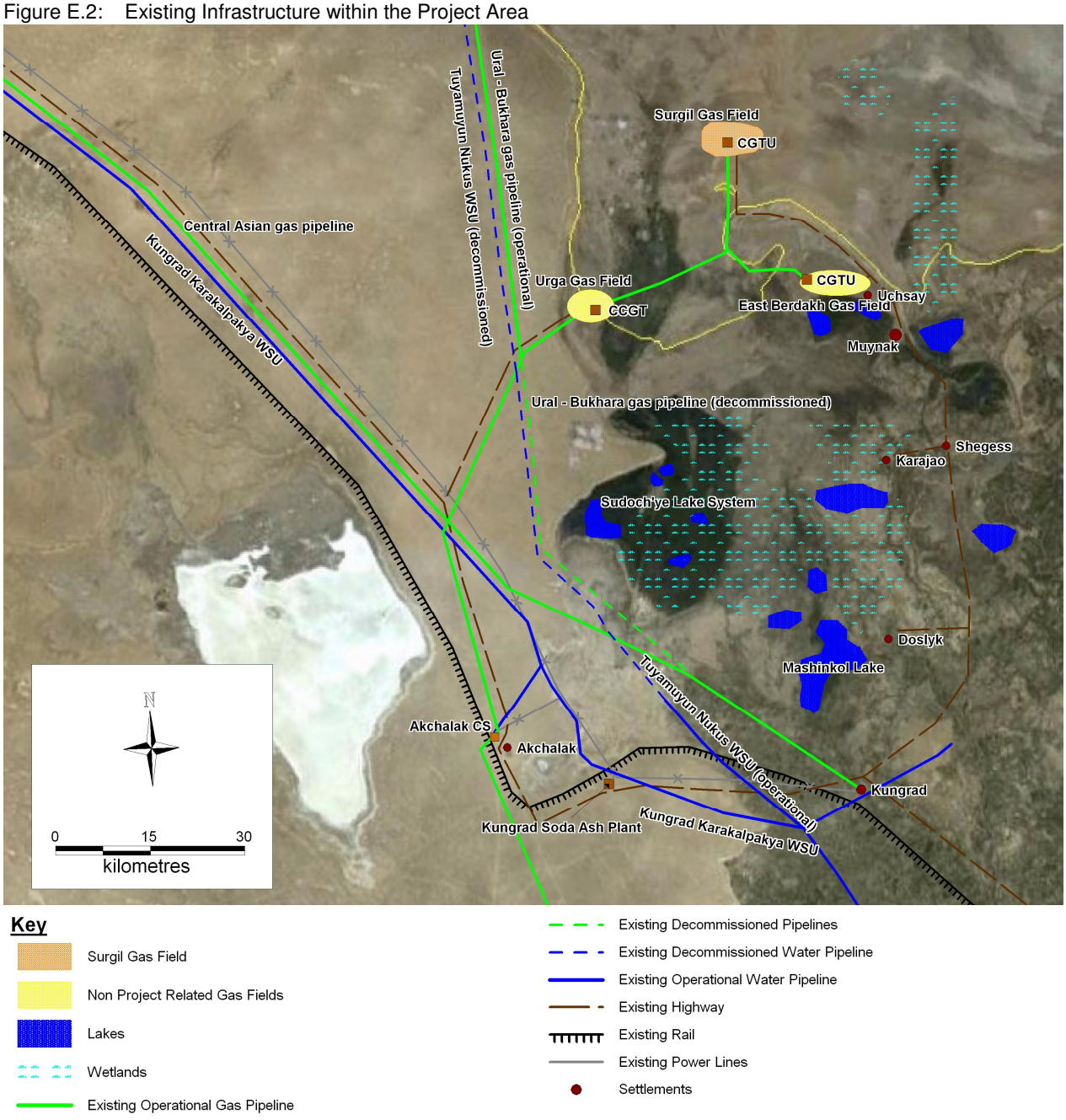
The Project is located within the Ustyurt region of the Republic of Karakalpakstan, a semi-autonomous area in the west of the Republic of Uzbekistan. Karakalpakstan borders with the Republic of Kazakhstan in the north and west, the Navoi region in the east, the Khorezm and Bukhara regions in the south-east and with Turkmenistan to the south. The location of Karakalpakstan within Uzbekistan and the wider region is illustrated within Figure E.1.

Figure E.1: Location of Project Within Uzbekistan

Source: Honam/Uz-Kor

The Surgil Field is located in the administrative district of Muynak. The proposed UGCC site is located in the Kungrad district. The location of key project components in relation to the wider Project area is shown in Figure E.2.

Figure E.2: Existing Infrastructure within the Project Area



Source: MML with Google Earth base map reproduced under licence

The northern part of the Project, comprising the upstream component of the project (Surgil Field) and the northern section of the pipeline route, is located to the south of the existing Aral Sea remnants. The Aral Sea is a landlocked basin that has reduced significantly in area and volume since the 1960s, initially as a result of poor water resource management within the former Soviet Union. The Surgil Field is located within the former footprint of the Aral Sea. The area is typically characterised by a flat, dry arid landscape and is low in vegetation cover. The plains are typically of high salinity. Further specific details are provided within the environmental baseline constituting part of the ESIA.

The nearest settlement to the Surgil Field is the small village of Uchsay, with a population of approximately 1,450 people. Uchsay is the most northerly settlement within Uzbekistan and is approximately 15 km north-west of the town of Muynak.

The southern extent of the Project, comprising the UGCC and southern section of the pipeline route, is located on the Ustyurt Plateau. The Ustyurt Plateau is an area of elevated land that stretches from the Aral Sea and Amu Darya river delta in the east to the Caspian Sea in the west and spans both Uzbekistan and neighbouring Kazakhstan. In total, the plateau extends approximately 200,000 km² and has an average elevation of 150 metres. The plateau in the vicinity of the Project site consists primarily of flat, monotonous stony desert and drops sharply to the former bed of the Aral Sea, presenting a cliff-like appearance.

The nearest settlement to the UGCC site is the village of Akchalak, located approximately 5 km to the south-west with a population of approximately 950 inhabitants. Akchalak is located approximately 50 km west of the town of Kungrad.

The pipeline route area is uninhabited and completely undeveloped other than oil and gas operations. Local inhabitants of Akchalak keep livestock which is grazed on the plateau. This is small scale activity with typically a number of families combining small livestock herds with a herder hired for seasonal migration. These are generally small scale agricultural practices that have experience in traversing pipeline routes during construction and once completed.

Lake Sudoch'ye and its associated system of lakes is located approximately 30km to the north east of the UGCC site and is the largest wetland area in the vicinity of the wider study area. The lake is located within the Amu Darya river delta, approximately 85 km to the south of the existing Aral Sea and approximately 60 km to the north-west of the town of Kungrad. The size of this lake can vary considerably depending on the level of the Amu Darya. Lake Sudoch'ye is a wetland of international importance for biodiversity and is one of the last wetlands remaining within the Amu Darya delta. The lake has been proposed for inclusion in the Ramsar List of Wetlands for International Importance.

E.2.3. The Project Parties

In March 2006, a memorandum of understanding was signed between UNG and Korean Gas Corporation ('KOGAS') for the realization of the Project. The Project was subsequently supported by an Uzbekistan Presidential Decree in February 2008 leading to the formation of the Uz-Kor in May 2008.

Uz-Kor is a joint venture between the state-owned holding company of Uzbekistan's oil and gas industry, UNG, KOGAS, Honam Petrochemical Corporation ('Honam'), and STX Energy Co. Ltd. ('STX') (collectively "the Sponsors"). The Sponsors intend to own and continue the development of the Surgil Field and to develop, build and own the UGCC facility.

A number of key conceptual design and pre-feasibility studies have been undertaken on behalf of Uz-Kor leading ultimately to an issue of an 'Invitation to Bid' (ITB) to potential EPC bidders and issue of Front End Engineering and Design (FEED) contract to bidders.

The Project is required to comply with the Republic of Uzbekistan national requirements for Environmental Impact Assessment (EIA) and all relevant international environmental treaties and conventions. A national EIA process is being undertaken by the Open Joint Stock Association 'UzLITIneftgaz' commissioned separately by Uz-Kor. UzLITIneftgaz has provided local support to the international ESIA and ESMP in its role as the Local Environmental Consultant (LEC) for the Project.

Uz-Kor appointed MML in January 2009 to act as IEC to conduct an international ESIA and develop an ESMP for the proposed development of the Project. As the first step in the ESIA process, MML produced a Scoping Report (April 2010) and this PCDP (May 2010)

MML also assisted Uz-Kor in developing this Public Consultation and Disclosure Plan (PCDP) (May 2010) the purpose of which is to guide consultation and disclosure activities to be undertaken by the Project for the purpose of informing the ESIA process and to ensure its quality, comprehensiveness and effectiveness. To date, MML teams have also conducted four visits to the Project study area.

E.2.4. Financing of the Project

Total estimated Project value for financing is approximately $US four billion.

ING Bank N.V. ('ING') has been mandated as the Financial Adviser to Uz-Kor and to assist in raising limited recourse financing.

The Asian Development Bank ('ADB'), Korean Export Credit Agencies and other commercial banks will be approached by Uz-Kor to provide assistance for (i) existing facilities and / or business activities that already exist and will form part of the future Project proposed for financing; and (ii) development of the UGCC on land or sites that has been mostly allocated prior to lender consideration of the Project.

E.3. Consultation Requirements

E.3.1. Overview

This sub-section provides an overview of the international consultation, disclosure and stakeholder engagement requirements of the ADB, the Equator Principles and the IFC, and the national requirements contained within the Uzbek EIA procedures.

E.3.2. International Consultation Requirements

Many large-scale international developments are required to comply with a number of requirements outlined by the Equator Principles, multilateral financing institutions. This is true for this particular Project, and the various consultation requirements which have to be met have been outlined below.

E.3.2.1. ADB Consultation Requirements

ADB's SPS (2009) explains that the ADB is committed to working with borrowers/clients to put meaningful consultation processes into practice. For policy application, the ADB see meaningful consultation as a process that:

i. Begins early in the project preparation stage and is carried out on an ongoing basis throughout the project cycle;
ii. Provides timely disclosure of relevant and adequate information that is understandable and readily accessible to affected people;
iii. Is undertaken in an atmosphere free of intimidation or coercion;
iv. Is gender inclusive and responsive, and tailored to the needs of disadvantaged and vulnerable groups; and

v. Enables the incorporation of all relevant views of affected people and other stakeholders into decision making, such as project design, mitigation measures, the sharing of development benefits and opportunities, and implementation issues.

ADB requires borrowers/clients to engage with communities, groups, or people affected by proposed projects, and with civil society through information disclosure, consultation, and informed participation in a manner commensurate with the risks to and impacts on affected communities. For projects with significant adverse environmental, involuntary resettlement, or Indigenous Peoples impacts, ADB project teams will participate in consultation activities to understand the concerns of affected people and ensure that such concerns are addressed in project design and safeguard plans.

ADB's Safeguard Requirement (SR) 1: Environment, specifies that projects must:

- Carry out meaningful consultation with affected people and facilitate their informed participation;
- Ensure women's participation in consultation;
- Involve stakeholders, including affected people and concerned nongovernmental organizations, early in the project preparation process and ensure that their views and concerns are made known to and understood by decision makers and taken into account;
- Continue consultations with stakeholders throughout project implementation as necessary to address issues related to environmental assessment;
- Establish a grievance redress mechanism to receive and facilitate resolution of the affected people's concerns and grievances regarding the project's environmental performance;
- Disclose a draft environmental assessment (including the ESMP) in a timely manner, before project appraisal, in an accessible place and in a form and language(s) understandable to affected people and other stakeholders;
- Disclose the final environmental assessment, and its updates if any, to affected people and other stakeholders; and
- Implement the EMP and monitor its effectiveness. Document monitoring results, including the development and implementation of corrective actions, and disclose monitoring reports.

E.3.2.2. The Equator Principles

Of the ten Equator Principles, Principle 5: Consultation and Disclosure specifically addresses requirements relevant to the PCDP which include:

- Consult with project affected communities in a structured and culturally appropriate manner;
- Ensure project affected communities' free, prior and informed consultation and facilitate their informed participation as a means to establish whether a project has adequately incorporated their concerns[1];
- Make available the ESIA documentation and action plan, or Non-Technical Summaries (NTS) thereof to the public for a reasonable minimum period in the relevant local language and in a culturally appropriate manner;
- Take account of and document the process and results of the consultation, including any actions agreed resulting from the consultation; and
- Ensure disclosure occurs early in the assessment process before the Project construction commences, and on an ongoing basis.

[1] This only applies to projects predicted to have significant adverse environmental and social impacts on affected communities.

The Equator Principles also state that projects are required to demonstrate compliance with IFC Performance Standards on Social and Environmental Sustainability (IFC Performance Standards). These standards also have specific requirements for consultation as specified below.

E.3.2.3. The IFC Performance Standards

There are eight IFC Performance Standards applicable to private sector projects in emerging markets. Each Performance Standard has specific consultation requirements and these are embedded in the general requirements of Performance Standard 1: Social and Environmental Assessment and Management Systems. These requirements are similar to those of the Equator Principles and they specifically refer to the need for and means of achieving community engagement, disclosure of relevant project information, appropriate consultation processes and grievance mechanisms.

The preparation of this PCDP has been informed by the following IFC good practice guidance documents:

- Stakeholder Engagement: A Good Practice Handbook for Companies Doing Business in Emerging Markets (May 2007); and
- Doing Better Business Through Effective Public Consultation: A Good Practice Manual (November 1998).[2]

E.3.3. National Consultation Requirements

Under the requirements of Uzbekistan (Decree of the Cabinet of Ministers of Uzbekistan on Approval of the Regulations on the State Environmental Expertise in the Republic of Uzbekistan No.491 of 31.12.2001 as amended on 05.06.2009) public hearings and disclosure of information are carried out at Stage II of the national EIA process in accordance with the SEE (or Glavgosekoexpertisa) Opinion on the need for public hearings.

The 'Statement on Environmental Consequences' details the alterations to the Project design which have been made in light of the SEE review of the first two stages of the EIA, the comments received through the public hearings if undertaken, the regulatory environmental limits applicable to the development and those environmental requirements associated with the development.

There is no official regulatory guidance as to which type of project requires a public hearing or how public hearings should be conducted. The approach to planning the public meetings as part of the PCDP process for the Project has been guided by typical local practice[3] and international best practice embodied by the standards summarised below.

[2] Both documents are available here (as of March 2009): http://www.ifc.org/ifcext/sustainability.nsf/Content/Publications_GoodPractice_StakeholderEngagement.

[3] Based on their extensive local knowledge and experience, the LEC have advised the IEC on the typical approach for undertaking public meetings in the Republic of Karakalpakstan specifically and Uzbekistan more generally.

E.4. Project Stakeholders

E.4.1. Area of Influence and Selection of Districts for Consultation

Within the Project area of Influence there is only one existing host community, the Akchalak settlement, which is located approximately 5 km south west of the UGCC location. Consultation has therefore been targeted towards this host community and more generally targeted to the two host districts of Kungrad (where Akchalak is located) and Muynak. Such an approach captures all members of the public and stakeholders who could potentially be directly or indirectly affected by the Project and associated infrastructure. The consultation process also included a range of local government bodies such as representatives from the local communities and also the Head of Education and Health, as these bodies held information that would be very important to the project.

E.4.2. Direct Stakeholders

Direct stakeholders include:

- People living in the closest communities to the Surgil Field and UGCC sites (there are no communities within close proximity to the pipeline route);
- Local women's groups;
- Local social and community service providers (e.g. health and education);
- Local governmental bodies related to public welfare, environmental protection and permitting for the Project;
- Existing Uz-Kor staff and their trade union representatives; and
- Neighbouring and supply chain industries and businesses including livestock owners using the Ustyurt Plateau.

The role of each stakeholder in the consultation process for the Project is summarised in Table E.1

Table E.1: Direct Stakeholder Groups

Stakeholder Group	Reasons for Inclusion within the Consultation Process
Affected Communities	
Upstream, Surgil Field - Uchsay settlement located 9km from Muynak	There is potential for this local settlement to be affected both negatively and positively by the proposed development, e.g. during construction phase of the gas field development. Consultation for Uchsay has been hosted in Muynak located in near proximity given a lack of suitable meeting facilities within the Uchsay settlement itself. It is important for local communities to be included within consultation process to ensure that they have the opportunity to voice any concerns they may have and also gain access to up-to-date information on the project and the ways in which they may be affected by it.
Downstream, UGCC site: Akchalak and Elabad Settlements	There is potential for these local settlements to be directly affected both negatively and positively by the proposed development, especially the Akchalak settlement where a new community will be constructed adjacent to the existing settlement to house workers and their families. It is important for local communities to be included within consultation process to ensure that they have the opportunity to voice any concerns they may have and also gain access to up-to-date information on the project and the ways in which they may be affected by it.
Local Government Bodies	
Heads of local government ('Aksakals') of closest settlements: ■ Uchsay settlement (Surgil Field)	Due to the scale of the proposed Project, local settlements will be interested in the practices being adopted to ensure that local communities are not negatively affected by the development. They will also be interested in the potential benefits that the Project may provide to these local settlements,

Stakeholder Group	Reasons for Inclusion within the Consultation Process
▪ Akchalak Settlement (UGCC) ▪ Muynak District Government ('Hakimyat') ▪ Kungrad District Government ('Hakimyat');	such as job opportunities and infrastructure improvements. Relevant stakeholder groups from the Muynak and Kungrad Hakimyat's are summarised below.
Manager of Kungrad and Muynak Hakimyat Education Departments	Interested in the potential local benefits that the Project may bring to the surrounding areas through the development of new schools and education facilities. This individual is also important to the consultation phase as they can provide a source of useful information.
Manager of Kungrad and Muynak Hakimyat Health Departments	They will have an interest in the health and safety aspects of the Project and what has been proposed to ensure that potential health impacts associated with the Project are minimised e.g. air pollution associated with construction phase. They will also be interested to know what health and welfare benefits the project will feed back to the local community, e.g. the development of new hospitals and health care facilities.
Manager of Kungrad and Muynak Hakimyat Agriculture Departments	They will be interested to know how the Project may impact on local agriculture practices (e.g. through water resource use). They will also be interested to know what benefits the Project will be feeding back into the local agriculture sector.
Republic of Karakalpakstan Government;	They will be interested to know what benefits the Project will be contributing to Karakalpakstan, such as the benefits to local health care, education, the production of local jobs and the opportunity to bring economic wealth to the area etc.
State Committee for Nature Protection ("Goskompriroda");	They will have an interest in ensuring that the Project and associated infrastructure will have minimal negative impacts on local nature and wildlife. They will also have an interest in what nature benefits the project will plan to bring to the local area in order to offset any negative impact the construction and operational activities may have on the local environment
Lower Amu Darya Basin Authority (responsible for water resources management).	They will be interested in ensuring that the Project does not affect the local watershed management practices which they carry out.
Institute of History, Archaeology and Ethnography, Uzbek Academy of Sciences	Interesting in safeguarding cultural heritage sites and practices of the Karakalpak peoples.
Aral Basin Delta Management Organisation	Manage the Aral Basin delta and will be interested in potential impacts on water flow as a result of the project's water abstraction and other activities/
Local Community Women's Groups	These groups promote the interests of women in pursuit of gender equality, they report to the Hakimyats. They will be interested in employment and other opportunities for women.
Existing Staff	
Manager(s) and staff representative(s) of Surgil Field and CGTU;	As these people are working at the current Surgil CGTU they will be affected by the transition to new ownership and expansion works associated with this Project. It is important that they are included in the consultation process in order for them to voice their opinions and have access to up-to-date information about the Project.
Manager(s) and staff representative(s) of drilling contractors at the Surgil Field;	As above
Local Industry and Business	
Kungrad Soda Plant (downstream);	Local industry which is located within the vicinity of the proposed project and therefore could potentially be affected by the projects development.
Urgenchtransgaz-operated Akchalak Gas Compressor Station and associated rail loading facility;	Local industry within the vicinity of the proposed UGCC Project development.
Livestock owners who use the Ustyurt Plateau in the summer	These livestock owners periodically use the pieces of land on which the UGCC and associated infrastructure (i.e. workers camp, rail connection,

Stakeholder Group	Reasons for Inclusion within the Consultation Process
	motor road connection, raw water supply line connection, sales gas pipeline, wastewater pipeline and disposal area and electrical power line connection, etc.) is proposed to be developed on.
Takhitash Dam Operators	Water abstraction for the Project must be assessed with consideration of flows in the catchment area of this dam.
Local Social Services in Project Affected communities	
Medical Centres	These facilities will be required to provide service to the new population of workers and their families entering the local communities
Schools	
Employment centres	Important for maximising local employment benefits.

E.4.3. Indirect Stakeholders

Indirect stakeholders can be defined as those persons or organisations that may be able to influence the outcome of the Project, either because they can contribute knowledge or improve project design or mitigate social and/or environmental impacts, or because they have political influence in the Project that needs to be considered. Indirect stakeholders relevant to the Project as identified in Table E.2.

Table E.2: Indirect Stakeholder Groups

Stakeholder Group	Reasons for Inclusion within the Consultation Process
National and International Government Bodies	
Ministry of Agriculture and Water Resources; Ministry of Labour Protection and Social Welfare; Ministry of Health Protection; Ministry of Foreign Affairs; Ministry of Amelioration and Water Facilities; Agency of Oversight on Safe Industrial Work Conduction and Upland Oversight; and United Nations Development Programme (UNDP).	National and International Government Bodies are important stakeholders as they are able to provide source of information to the consultation phase. For example, information relating to local labour practices. They also have the ability to influence decisions made regarding the Project.
Non-Governmental Organisations and Civil Society	
“International Fund of Saving Aral (IFSA)”; “National Association of Uzbekistan NGOs”; “Education and Development”; “Intellect” (concerned with interests of young people); “Development of Abilities of Disabled People”; “Karakalpak Department of Uzbek Association on Reproductive Health”; “Soglom Avlod Uchun” (concerned with safeguarding local welfare); “Association of General Doctors of the Karakalpakstan Republic”; “Association of Businesswomen”; “Daulet” (implements donor funded community development programmes); “Golden Heritage of the Aral”; “Union for Protection of Aral and Amu-Darya”; “Environmental Movement of Uzbekistan”; “Armon” (concerned with environmental rights); “Alliance on Saving Saiga” (concerned with protection of wild antelope); “Union for Protection of the Aral Sea and Amu Daryu”;	Non-Governmental Organisations (NGOs) are an important source of information for the Project consultation phase, for example information relating to local cultural practices and community values. They also have the power to influence aspects of the Project to ensure that the Project is carried out in an environmentally and socially sound manner.

Stakeholder Group	Reasons for Inclusion within the Consultation Process
“Fund for a Healthy Generation” “EkoSan” (concerned with health and environmental issues); “Karalkalpak State Art Museum”; “Centre for Social and Economic Research (academic institute)”; “International Red Cross”; “GreenPeace”; and “Uzbekistan Society for the Protection of Birds (Bird Life)”. “Committee of Writers of Karakalpakstan” “Organsation of Blind People”	
Media	
"Free Karakalpakstan" (regional newspaper in Karakalpak language); "Narodnoe Slovo" (national newspaper in Russian language); and "Khalk Suzi" (national newspaper in Uzbek language) "Erkin Karakalpakstan" local news paper	It is necessary for local media groups top be involved in the consultation process as from a publicity point of view it is important that they have access to complete sources of information to ensure that media coverage is delivering the most up-to-date and accurate Project information.

E.5. Public Consultation and Disclosure Implementation Programme

E.5.1. Overview

This section presents the activities undertaken during the ESIA process and their outcomes, and summarises those activities planned throughout the remainder of the Project's lifecycle. These activities are presented in chronological order in Table E.3 below.

Table E.3: ESIA Consultation and Disclosure Chronology

Project Phase	Activity	Date	Objectives
ESIA Scoping	Preliminary Stakeholder Meetings	February 2009	• Disclose information about the Project and the consultation process; • Enable the site visit team to respond to any queries / concerns that stakeholders had about the Project; and • Obtain where possible baseline environmental and social information relevant to the Project.
	Scoping Report Non-Technical Summary Disclosure	July 2010	• Disclose the contents of the Scoping Report in full and in a condensed community leaflet • Invite comments before finalisation of the ESIA ToR • Invite people to Scoping Public Exhibitions
	3 x Scoping Public Exhibitions	July 2010	• Disclose the contents of the Scoping Report • Respond to stakeholder concerns or queries and ensure they are addressed in the ESIA • Invite comments before finalisation of the ESIA ToR
ESIA Assessment	ESIA Private Meetings with: • Regional / District Government Departments • Community leaders • Community women • Community businesses • NGOs	August 2010 - March 2011	• To gather specialist information and identify specialist stakeholder concerns for inclusion in the ESIA • To encourage participation of project affected communities in the ESIA process
	3 x Draft ESIA Public Exhibitions	July 2011	• Disclose the contents of the Draft ESIA • Respond to stakeholder concerns or queries and ensure they are addressed in the ESIA before finalisation • Invite comments before finalisation of the ESIA
ESIA Reporting	Draft ESIA National Disclosure	August 2011	• Disclose the full Draft ESIA at locations accessible to local communities together with the Non Technical Summary • Invite comments before finalisation of the ESIA
	Draft ESIA International Disclosure	August 2011	• Disclose full draft ESIA on ADB and Uz-Kor website for a period of 120 days within which time stakeholders can comment before ESIA finalisation
	Disclosure of final ESIA Report	November 2011	• Disclose final ESIA so stakeholders can participate in monitoring
ESMP Monitoring during construction and operation	Ongoing stakeholder engagement and implementation of grievance mechanism	Throughout construction, operation and decommissioning	• Receive and resolve grievances • Disclose information about Project risks, impacts and opportunities

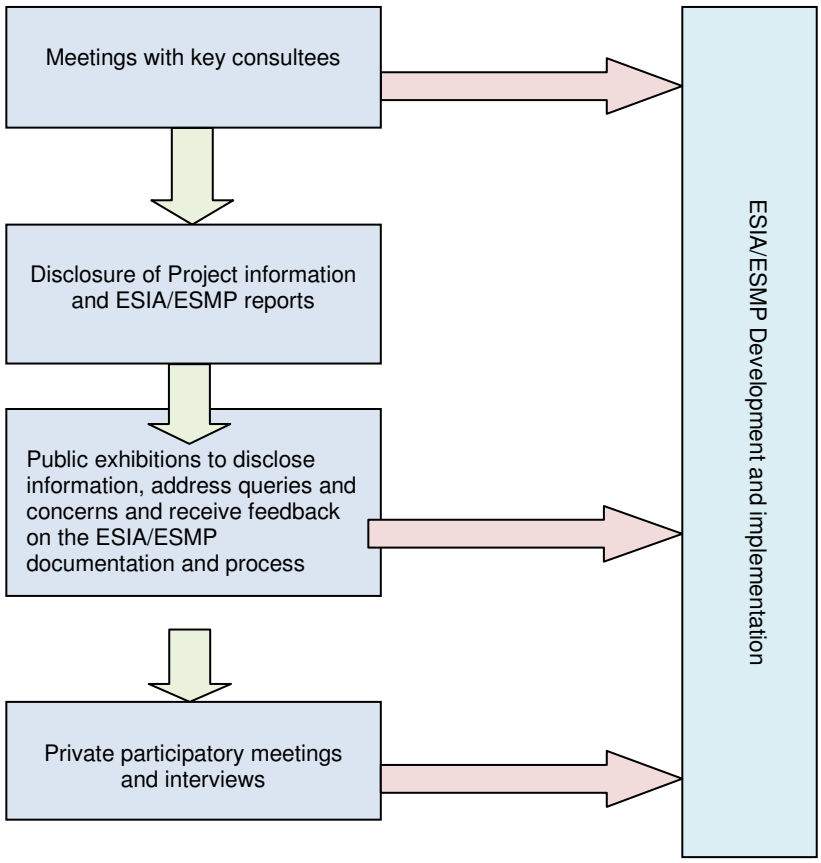
Project Phase	Activity	Date	Objectives
	Disclosure of monitoring reports	Bi-annually	• Disclose effectiveness of ESMP

E.5.2. ESIA Consultation

E.5.2.1. Overview

The ESIA consultation, disclosure and participation activities planned and undertaken can be broadly categorised into the components identified in Figure E.3.

Figure E.3: ESIA Consultation, Disclosure and Participation Components



These activities were planned and undertaken to varying degrees, throughout the ESIA scoping, assessment, reporting phases as outlined below. ESIA monitoring is planned throughout the lifecycle of the Project as described in section E.5.3.

E.5.2.2. ESIA Scoping Consultation

Preliminary Stakeholder Meetings and Interviews

During the first ESIA site visit in February 2009, preliminary meetings were planned and conducted with a number of the Project's identified direct stakeholders. The general purpose of these meetings was for the

site visit team (consisting of Uz-Kor and international and local ESIA team environmental and social specialists) to:

- Disclose information about the Project and the consultation process;
- Enable the site visit team to respond to any queries / concerns that stakeholders had about the Project; and
- Obtain where relevant environmental and social information to inform the scoping study by gathering baseline information and identification of likely significant impacts.

Meetings were planned and conducted with the following stakeholders:

- Republic of Karakalpakstan State Committee for Nature Protection ("Goskompriroda"), 02.02.09, State Environmental Committee Office in Nukus;
- Manager of Surgil Field and CGTU, 03.02.09, Surgil Separation Plant;
- Aksakal of Uchsay settlement, 03.02.09, Aksakal Office;
- Aksakal of Akchalak settlement, 04.02.09, Aksakal Office; and
- Kungrad (downstream) District Government ('Hakimyat'), 05.02.09, Uz-Neftegaz Office in Kungrad.

In order to put stakeholders at ease, meetings were arranged by Uz-Kor and held in locations most suitable for stakeholders, in most cases in their office premises. All meetings were conducted in Russian and / or Karakalpak depending upon the mother tongue of the stakeholders, with translation to and from English as necessary.

During the meetings, the site visit team introduced themselves, explained the Project and the ESIA process and then invited comments and questions. Any comments or questions raised by stakeholders were discussed until the stakeholders were satisfied with the level of information provided. The site visit team asked open ended questions to gauge initial opinions on the Project; in some cases more detailed questions were asked in order to obtain specific baseline information. The outcomes of these meetings are detailed within the ESIA Volume II.

The information gathered from these meetings, along with a review of project documentation and site visit observations was used to produce the Scoping Report in February 2009. Following project delay, the Scoping report was updated and finalised in April 2010.

Scoping Report Non-Technical Summary Disclosure

Information about the Project and the findings of the Scoping report were disclosed to all of the stakeholders identified in E.4 via distribution of Scoping Non-Technical Summary (NTS) documentation (see Annex B and C). The objectives of this disclosure were to enable informed participation of stakeholders in the ESIA process and to invite comments before finalisation of the ESIA Terms of reference (TOR) outlined in the Scoping Report.

The Scoping NTS information was essentially a summary of the preliminary review of environmental and social impacts and how they will be assessed in the ESIA process. The Scoping NTS documentation was set out in simple language and non-technical terms making it easy to understand for people who are not familiar with the Project, the ESIA process and other technical engineering, social and/or environmental phraseology. It was produced in two formats targeting two different groups of stakeholders and consideration was given to education, profession and literacy levels when deciding on levels of detail, style and substance. The following two Scoping NTS documents were produced for distribution:

- Scoping NTS Report; and
- Scoping NTS Community Leaflet.

The Scoping NTS Report was produced in the two national languages, Russian and Uzbek, and the regional language, Karakalpak. The Scoping NTS Community Leaflet was produced only in Karakalpak.

The Scoping NTS Report was distributed via post in July 2010 to non-local stakeholders who may be affected by or have an opinion on the Project. The report was accompanied by a covering letter inviting the stakeholders to comment on the Project either via written correspondence or in person at Scoping Public Exhibitions (see below).

The Scoping NTS Community Leaflet was a four page document that was distributed to local community members in July 2010 who may be directly affected by the Project. This leaflet included details of the public exhibitions and described the process for making formal comments. The leaflet was distributed in public meeting places such as the town hall and other social meeting places. Through engagement with local government officials, particular efforts were made to target information to marginalised or vulnerable members of the community and encourage their participation at, and input to, the public exhibitions.

Scoping Public Exhibitions

The Scoping NTS information was also presented at three Scoping Public Exhibitions organised for interested stakeholders at the following locations:

- Kungrad City (capital of the downstream District), 27.07.10;
- Akchalak Settlement (downstream project affected community where residents of Elabad have access to as well), 28.07.10; and
- Muynak City (capital of the upstream District where residents of nearby Uchsay have access to), 29.07.10.

These events were organised in coordination with the Kungrad and Muynak Hakimyats (District Governments) and residents of each district were invited to any or all of the three meetings through the media outlets.

The objectives of these exhibitions were to disclose the contents of the Scoping Report (including the PCDP), respond to stakeholder concerns or queries about the Project and the ESIA process and to ensure that they are addressed in the ESIA and to facilitate stakeholder participation prior to finalisation of the ESIA ToR.

The public exhibitions were announced and publicised in the local newspapers seven days in advance (the generic press release to newspapers for these consultation events is presented in Appendix F, Volume III). In addition, written invitations were sent to stakeholders along with the Scoping NTS Report. The Scoping NTS Community Leaflet that was distributed in local communities also had details of the exhibitions.

At the exhibitions there were information boards with project information and a summary of the Scoping study findings. These were presented alongside the ESIA/PCDP programme, followed by a ‘question and answer’ session and discussions. The outcomes of these exhibitions are detailed within the ESIA Volume II and full photo reports of the three public exhibitions are presented in Appendix G, Volume III.

E.5.2.3. Main ESIA Consultation

ESIA Assessment Private Meetings

Following completion of the Scoping Phase of the ESIA, the main ESIA assessment commenced and a number of private meetings were planned and held with stakeholders to disclose information and gather specialist opinions on key areas of the assessment. These meetings are summarised in Table E.1 below.

Table E.1: Summary of ESIA Assessment Private Meetings

Date	Stakeholder(s) met	Meeting location
25th Nov. 2010	Kungrad/ Muynak District Hakimyat	Kungrad and Muynak Town Halls
25th Nov. 2010	General Manager of Soda Ash Plant	Akchalak
11 March 2011	Takhitash Dam Operators Management	Takhitash Dam
14 March 2011	Lower Amu Darya River Basin Management Board ('NABUIS'), Ministry of Agriculture and Water Resources	Nukus
14 March 2011	Woman representative of Akchalak Gas Compressor Station	Akchalak
14 March 2011	General Manager, Akchalak Gas Compressor Station	Akchalak
14 March 2011	Head of Akchalak Community Women's Group	Akchalak
14 March 2011	General Manager of Soda Ash Plant	Akchalak
15 March 2011, 25 Nov. 2010	Institute of History, Archaeology and Ethnography, Uzbek Academy of Sciences	Nukus
15 March 2011	Aral Basin Delta Management (ABDM)	Nukus
16 March 2011	Ministry of Agriculture and Water Resources	Tashkent

The information gathered and concerns raised at these meetings have been fed back to the relevant ESIA specialists and addressed in the assessment to produce the ESIA.

E.5.2.4. ESIA Disclosure

Draft ESIA Disclosure - Uzbekistan

The draft ESIA documentation (including the Non-Technical Summary) is anticipated to have been translated to Russian, Uzbek and Karakalpak before the end of August 2011 and hard copies will be disclosed in the local communities to enable local stakeholders to raise comments and concerns before finalisation. One copy of the draft ESIA will be provided at the following locations in Karakalpakstan:

- Uz-Kor Head Office in Nukus;
- UstyurtGaz head office in Kungrad;
- Muynak District Hakimyat office in Muynak Town;
- Kungrad District Hakimyat office in Kungrad District; and
- Akchalak Settlement Aksakal Office in Akchalak.

The report will also be posted in all languages on the Uz-Kor website: www.Uz-kor.com.

Draft ESIA Disclosure - International

The draft ESIA will be disclosed on the ADB website (scheduled for mid August 2011) in English for a period of 120 days in accordance with the ADB Operational Manual. During this period, national and international stakeholder comments will be addressed and incorporated into the ESIA before finalisation scheduled for December 2011.

Disclosure of Final ESIA Report

After the 120 disclosure period and once stakeholder and ADB comments and queries have been incorporated and addressed in the ESIA report, the report will be finalised. The final ESIA will be disclosed in the local communities and on the Uz-Kor and ADB website. Hard copies of the draft ESIA will be provided in the local communities at the following locations:

- Uz-Kor Head Office in Nukus;
- UstyurtGaz head office in Nukus;
- Muynak District Hakimyat office in Muynak Town;
- Kungrad District Hakimyat office in Kungrad District; and
- Akchalak Settlement Aksakal Office in Akchalak.

E.5.3. Consultation Planned throughout the Lifetime of the Project

E.5.3.1. Overview

In order to comply with international finance standards, the Project requires public consultation and disclosure activities and mechanisms to continue beyond the ESIA process throughout the lifecycle of the Project. These activities, which include disclosure of ESMP monitoring reports, will be guided by the activities outlined in Table E.1 and the sub-sections below. The measures are proposed to facilitate stakeholder monitoring of the Project over time and promote long-term sustainability through an iterative cycle of improvements to environmental and social management of the Project.

Table E.1: Summary of Stakeholder Engagement activities beyond the ESIA Phase throughout the Project's lifetime

Project Phase	Stakeholder Engagement Activity	Frequency	Responsibility
Construction	Disclosure of recruitment policy and employment opportunities within local communities and via employment centres	Three months before construction commences	Uz-Kor / EPC Contractor
	Grievance logging and resolution	Continuous	Uz-Kor and EPC contractor CLOs
	Disclosure of ESMP monitoring reports and grievance records	Every six months	Uz-Kor
	Community Information campaigns	At start of construction and annually thereafter, continuing in to operations	Uz-Kor
Operations	Public Exhibition to announce the commissioning of the plant, potential impacts and how they will be managed. Also to disclose employment opportunities.	1 month before commissioning	Uz-Kor
	Disclosure of ESMP monitoring reports and annual Sustainability Reports to summarise ESMP complaints and other sustainability issues. (see Volume IV)	Annually	Uz-Kor

Project Phase	Stakeholder Engagement Activity	Frequency	Responsibility
	UGCC Facility and Visitor Centre Tours for Local School Children	Annually	Uz-Kor
Decommissioning	Public Exhibition to announce the de-commissioning of the plant, potential impacts and how they will be managed, for example through land restoration.	1 months before decommissioning	Uz-Kor
	Consultation and disclosure activities with workers who will be affected by retrenchment. The retrenchment procedures, timelines and workers legal and additional rights and entitlements will be clearly presented to them in accordance with the retrenchment plan to be developed for the Project.	At least one month prior to retrenchment activities commencing (to be more clearly defined in specific decommissioning retrenchment plan to be developed at the time).	Uz-Kor

E.5.3.2. Consultation and disclosure during construction

Disclosure of Recruitment Policy and Employment Opportunities

The ESIA for the Project identifies that Muynak and Kungrad districts and the Karakalpakstan Autonomous Oblast are areas suffering from deprivation and underemployment. Employment generation as a result of the Project is considered to be a positive impact, and measures are specified to maximise the local benefits of this impact through local skills utilisation. A key means to achieve this will be through the disclosure of local employment opportunities and Uz-Kor's equal opportunities recruitment policy.

Uz-Kor and the EPC Contractor will advertise job specifications and Uz-Kor's equal opportunities recruitment policy within the local communities via the local community and district Hakimyat offices and through local employment centres. This will be done at least three months before construction commences in order to provide candidates with sufficient time to make inquiries and mobilise their applications.

Disclosure of ESMP Monitoring Reports and Grievance Records

In accordance with the Environmental and Social Management Plan (ESMP) produced for the Project by MML, Uz-Kor will undertake internal monitoring against the ESMP Key Performance Indicators (KPIs) to measure the success of the environmental and social management process and identify non-compliances and corrective actions. The findings of this monitoring will be summarised in ESMP Monitoring reports.

Every six months Uz-Kor will disclose monitoring reports including grievance records (the grievance mechanism is described in see E.6) to stakeholders and local communities. Reports will be place on the Uz-Kor website and hard copies of reports will be provided to local community and district Hakimyat offices for citizens to view.

Community Information Campaigns

In accordance with the Environmental and Social Management Plan (ESMP) produced for the Project by MML, Uz-Kor will undertake a number of community information campaigns through the distribution of leaflets and the provision of some seminars.

Leaflets will be distributed in the community via the local Hakimyat offices in Akchalak and Uchsay (and during operations, also in the UGCC visitors centre discussed below) in relation to:

- HIV/Aids awareness;
- Community health and safety and emergency procedures during construction (and then new leaflets focussing on operational safety issues);
- Financial management and sustainable investment decisions, so that local supply chains secure long term security from the cash injection resulting from the project.

These leaflets will be produced in Karakalpak, Uzbek and Russian.

E.5.3.3. Consultation and Disclosure During Operations

Operational Public Exhibition

Once operation of the downstream facilities commence, new impacts will be felt and new environmental and social management measures will be employed by Uz-Kor, as specified in the ESIA. In order to make local community members aware of any new impacts or community health, safety and security risks and the safeguard measures employed to mitigate them, a public exhibition will be held in the new Akchalak community one month prior to operations commencing. The exhibition will announce the commissioning of the plant and describe potential impacts and how they will be managed as well as disclosing any new employment opportunities.

Disclosure of ESMP Monitoring Reports and Annual Sustainability Reports

Whereas during construction ESMP monitoring reports will be disclosed bi-annually, during the operational phase Uz-Kor will be disclose them annually to facilitate ongoing stakeholder monitoring of the Project's environmental and social performance over time. The reports will detail any community investment activities undertaken in the previous year and those planned for the following year.

UGCC Facility and Visitor Centre Tours for Local School Children

The UGCC will include a visitor's centre that will also be used as a training and resource centre. This will include interactive displays and information about the history of the region and it's unique landscape and Karakalpak culture, the development of the Project, and sustainable future plans. Uz-Kor will provide annual educational tours for local school children around the UGCC facility (including this visitors centre) to explain the process technologies employed, the development of the project and future plans, and career opportunities in the oil and gas extraction and processing industry.

E.5.3.4. Consultation and Disclosure During Decommissioning

Decommissioning Public Exhibition

The Project ESIA explains that during the decommissioning phase of the project, all of the industrial facilities will be removed, the gas wells will be capped and the land will be reclaimed without any contamination. The pre-project landscape will be restored and the land will be available for re-allocation for other uses such as other industrial development or commercial activities including fishing.

To announce the de-commissioning of the plant, describe potential impacts and how they will be managed, for example through land restoration, Uz-Kor will hold public exhibitions in the Akchalak settlement

9downstream) and in the Uchsay communities (upstream) one month prior to decommissioning commencing.

E.6. Project Grievance Redress Mechanism

E.6.1. Overview

A project performance grievance mechanism has been established prior to the commencement of construction activities and an ongoing grievance register will be maintained through construction and operation.

E.6.2. Community Liaison Officer

Uz-Kor has appointed a Community Liaison Officer (CLO) who will be a local point of contact for enquiries or complaints related to the Project's performance. During the construction phase the CLO will be physically located at the site of the UGCC with regular (weekly) visits to the upstream element of the Project. During construction, the CLO will organise weekly 'surgeries' in the settlements of Akchalak and Muynak during which any member of the public can attend and speak to the CLO in person raising any grievance or observation. These will be recorded as per the prescribed procedure in the Grievance Mechanism. In addition, the CLO will hold weekly meetings with the Aksakals of the Akchalak, Elabad and Uchsay settlements to ensure that any grievances lodged by members of the publich direct to the Aksakal are communicated through to Uz-Kor for documentation and resolution as per the Grievance Mechanism.

During the operational phase the CLO's fixed point of contact details will be the Uz-Kor registered office in Nukus,

Sultan S. Annaklychev, Community Liaison Officer, Uz-Kor Gas Chemical
133A Dostnazarov Street
Nukus City
Republic of Karakalpakstan
Republic of Uzbekistan
Nukus Office Mob. +99890 727 92 77
Fax +99861 222-21-87
e-mail: sultanshakh@mail.ru

In addition contact details for the head office in Tashkent are also provided in the event that stakeholders want to raise issues in relation to the performance of the CLO requiring alternative contact access to the Uz-Kor organisation.

First Deputy Chairman, Mr Leonid Evdokimov, Uz-Kor Gas Chemical
Uz-Kor Gas Chemical
12th Floor
International Business Centre
107B Amir Temur Street
Tashkent
Republic of Uzbekistan
Tashkent Office Number. +99871 238 92 23
Fax +99871 238 92 24

This position was advertised in the local communities and via the Karakalpak Regional Governments. The full job description is provided in Volume IV.

The CLO will be the point of contact for submitting written comments and grievances about the Project. Anyone will be able to submit a grievance to the Project if they believe a practice is having a detrimental impact on the community, the environment, or on their quality of life. They may also submit comments and suggestions. A format for logging grievances will be established.

The CLO's contact details will be disclosed to the local community and displayed prominently on the site boundary along with the likely duration of construction works. The CLO will organise and manage the project performance grievance mechanism and processes related to localised disturbances. The CLO will also be responsible for disseminating appropriate information on the construction programme and operational maintenance works on a timely basis to those who are likely to be indirectly affected or if specific impacts are potentially a nuisance. Uz-Kor will also include clauses in the EPC and sub-contractor contracts stating that they will need to identify a staff member responsible to act as their own CLO, who will regularly report to the main Uz-Kor CLO.

The Contractor CLO will be a permanent presence at the each of the construction sites. The role of the contractor CLO will be to support the Uz-Kor CLO and report to them on grievances and other community concerns or issues during periods where the Uz_Kor CLO is not at that specific location. The contractor CLO will also be responsible for informing the Uz-Kor CLO on construction programming thereby allowing sufficient forewarning to local communities of any exceptional construction activity that may give rise to temporary disturbance.

E.6.3. Uz-Kor Website

Uz-Kor have established a project specific website with the following address: www.Uz-Kor.com. This website will have a 'contact us' page with a summary of the grievance mechanism outlined below and an invitation for stakeholders to submit concerns and comments.

E.6.4. Grievance Classification, Logging and Resolution

A tabulated standard form will be prepared for recording any environmental complaints that are received from the public or government organisations by whatever medium i.e. visits to the site, telephone calls or correspondence. The form will concisely list the following information:

- Date of the complaint;
- Name and contact address of the complainant;
- Brief description of the complaint, with a file reference to any correspondence from the complainant;
- Brief description of the action taken by the Project Plant Management to investigate the cause of the complaint and bring about corrective action, if justified; and
- Date of reply to the complainant, with a file reference to any correspondence.

The CLO will complete the complaints record and classify grievances according to Table E.1

Table E.1: Grievance Classification Criteria

Grievance Classification	Risk Level	Validity	Response
Low	No or low	Unsubstantiated	CLO will conduct investigation, document findings and provide a response

Grievance Classification	Risk Level	Validity	Response
Medium	Possible risk and likely a one off event	Possible substantiation	CLO and an appropriate investigation team will conduct investigation. The Site Manager or HS Manager may decide to stop work during the investigation to allow the corrective preventive actions to be determined. The CLO will provide a response.
High	Probable risk and could reoccur	Probable substantiation	CLO will get EPC to organise a Major Investigation Team including Uz-Kor for prompt investigation and resolution. Work will be stopped in the affected area. The CLO will provide a response.

The Project will aim to protect a person's confidentiality when requested and will guarantee anonymity in annual reporting. Individuals will be asked permission to disclose their identity. Investigations will be undertaken in a manner that is respectful of the aggrieved party and the principle of confidentiality. The aggrieved party will need to recognise that there may be situations when disclosure of identity is required and the Project will identify these situations to see whether the aggrieved party wishes to continue with the investigation and resolution activities. There will be no costs or retribution of any kind associated with using the grievance mechanism.

The CLO will log receipt of the grievance, formally acknowledge it, track progress on the investigation and resolution, and respond in writing with feedback to the aggrieved party. The CLO will initiate the investigation and ensure its speedy conclusion aiming to provide a response with 10 working days, unless there are exceptional circumstances. If the Project receives a large number of unsubstantiated grievances, the process will be reviewed to define instances when no response is needed.

Uz-Kor and the CLO will use environmental and social indicators during the construction phase to monitor effectiveness of the system. Project staff, and outside authorities as appropriate, will also contribute to the investigation. The CLO will identify an appropriate investigation team with the correct skills to review the issue raised and to decide whether it is Project related or whether it is more appropriately addressed by a relevant authority outside the Project. The investigation will also aim to identify whether the incident leading to the grievance is a singular occurrence or likely to reoccur. Identifying and implementing activities, procedures, equipment and training to address and prevent reoccurrence will be part of the investigation activities. In some cases it will be appropriate for the CLO to follow up at a later date to see if the person or organisation is satisfied with the resolution or remedial actions.

The CLO will summarise grievances to report on project performance bi-annually during construction and annually during operation removing identification information to protect the confidentiality of the complainant and guaranteeing anonymity.

E.7. Roles, Responsibilities and Resources

E.7.1. Overview

The division of roles, responsibilities and resources for implementation of the PCDP is summarised in Table E.2

Table E.2: Summary of Role, Responsibilities and Resources for PCDP Implementation

Individual / Organisation	Role	Main Responsibilities	Resources
MML	International Environmental Consultant (IEC)	Preparing this PCDP, Undertaking the ESIA consultation,	Consultancy fees paid by Uz-kor
UzLITIneftgaz	Local Environmental Consultant (LEC)	Understanding of national EIA requirements; assisting with ESIA consultation	Consultancy fees paid by Uz-kor
Uz-Kor CLO	Implementation of PCDP	PCDP activities; logging and addressing grievances; stakeholder logging; organising events; monitoring contractors	Salary paid by Uz-kor; HSE budget for PCDP activities, e.g. printing flyers, organising events
Uz-Kor HSE Manager	Overall responsibility for implementing this PCDP	Collating data for monitoring and other reports; managing media relations; Monitoring contractors	Salary paid by Uz-kor; HSE budget for PCDP activities, e.g. printing flyers, organising events
EPC Contractor CLO	Day to day community liaison activities	Responding to queries from the public on a day to day basis; reporting grievances and queries to Uz-Kor CLO.	EPC Contractor budget

E.7.2. Mott MacDonald Ltd. (MML) - International Environmental Consultant (IEC)

MML has been appointed by Uz-Kor to prepare the ESIA documentation, including the PCDP, to be aligned with national legislation and international finance requirements. MML has worked alongside the Local Environmental Consultant (LEC) to assist Uz-Kor with the implementation of the PCDP and the reporting of results by undertaking the following:

- Participation in stakeholder meetings;
- Provision of the content for the Scoping and the main ESIA NTS Reports;
- Provision of the text for the Scoping NTS Community Leaflet;
- Provision of a consultation log template;
- Monitoring implementation of the PCDP by the LEC and updating the work plan accordingly; and
- Writing up the outcomes of the PCDP implementation in the ESIA Report.

These activities have been financed through consultancy fees paid by Uz-Kor

E.7.3. UzLITIneftgaz - Local Environmental Consultant' (LEC)

In accordance with the LEC Scope of Work / Work Plan, the LEC will be responsible for implementing the majority of the PCDP activities. Specific actions will include:

- Continued assistance with stakeholder identification;
- Interpretation of local consultation regulatory requirements;
- Distribution of Scoping Report NTS documentation:
- Mail out of Scoping NTS Report and supporting letter on Uz-Kor letterhead;
- Distribution of Scoping NTS Community Leaflet at appropriate locations in Project affected communities;
- Logging and summarizing all written consultation comments and grievances and communicating them back to the IEC ESIA team through regular updates;
- Additional private meetings with key stakeholders (if required); and
- Organizing and manning public and private meetings.

The LEC will bear the costs related to these activities. All deliverables to the IEC from LEC will be in Russian language.

E.7.4. Uz-Kor Community Liaison Officer (CLO)

The individual who assumes the day to day responsibilities fo5r implementing this PCDP will be the CLO, whose duties will include:

- Planning and oversight of all consultation and disclosure activities including
  - Disclosure of recruitment policy employment opportunities;
  - Disclosure of ESMP monitoring reports and grievance records;
  - Community information campaigns;
  - Organising and attending all public exhibitions;
  - Disclosure of ESMP monitoring reports and annual Sustainability Reports; and
  - UGCC facility and visitor centre tours for local school children.
- Logging and responding to grievances as specified in the grievance mechanism;
- Stakeholder logging;
- Updating this PCDP on an annual basis;
- Processing and responding to media and other queries;
- Monitoring contractor CLO consultation and disclosure activities and coordinating with the contractor CLO.

The CLO will have a ring-fenced section of the HSE budget for PCDP implementation.

E.7.5. Uz-Kor Health, Safety and Environment (HSE) Manager

The Uz-Kor HSE manager will assume overall responsibility of the PCDP implementation and will monitor the effectiveness of the Uz-Kor CLO. The HSE manager will collate all grievances and other PCDP monitoring information provided and include this in Uz-Kor's bi annual monitoring reports during construction and the annual operational monitoring reports.

E.7.6. EPC Contractor Community Liaison Officer (CLO)

It is a requirement in the EPC contract ToR's fro the contractors to also appoint CLO officers in different Project location. Their job will be to manage day-to-day interactions with the public and implement their own community grievance mechanism at the construction sites and workers camps. All grievances and request received must be communicated to the Ux-Kor CLO who will monitor the contractor CLO's effectiveness.

E.8. Reporting

The results of the ESIA public consultation and information disclosure activities defined within this PCDP have fed into the ESIA and be summarised in the ESIA report. This documentation will be disclosed on the ADB and the Uz-Kor websites, as well as the local communities, as described in section E.5.2.4.

Uz-kor will produce construction monitoring reports including analysis of the performance in implementing this PCDP and grievance records on a bi-annual basis during construction, and annually thereafter, as described in section E.5.3.

Annex A - Preliminary Guidance and Action Plan

Project Title	Surgil Project	Division	N/A
Subject	PDCP – Preliminary Guidance and Action Plan	Our Ref.	N/A
Location	Radisson, Tashkent	Date of visit	N/A
Date and time of meeting	17 May 2010		
Attendees			
Uz-Kor Local Environmental Consultant (LEC)	Alisher Kasimov (AK) Ludmilla Hegay (LH) LEC PCDP Assistant		
International Environmental Consultant (IEC)	David Boyland (DB) Jamie Crawford (JC) Elena Zaika (EZ) Mark Johnston (MJ) Aliona Strokina (AS)		

Item	Subject	Led by
1	**Disclosure of Project Information** Information will be disclosed to the public via distribution of Project documentation in two forms, namely the: • Scoping NTS Report; and • Scoping NTS Community Leaflet. The Scoping NTS Report is a 15 to 20 page document that will be produced in the two national languages, Russian and Uzbek, and the regional language, Karakalpak. The Scoping NTS Community Leaflet will be approximately 4 pages long and produced only in Karakalpak. The IEC will provide Uz-Kor with English language versions of both documents. These should be translated as appropriate by Uz-Kor and passed to the IEC for approval prior to issue to the LEC for public distribution. In addition, public exhibitions will also be held to allow a greater deal of Project information to be communicated with any interested parties or individuals. The public exhibitions will allow an opportunity for the public to raise any concerns or demonstrate any support for the Project and also for Uz-Kor to consider these concerns as appropriate. Public exhibitions are considered a more favourable consultation process to public meetings which can be dominated by a select group of individuals with specific agendas and hence not facilitate open and transparent consultation.	Uz-Kor, LEC
2	**Contents of Project Information Documents** The Scoping Report NTS is a summary of the full Scoping Report and will include technical references and assume a certain standard of understanding. The Community Leaflet is written using simple language and non-technical terms making it easy to understand for people who are not familiar with the Project, the ESIA process and other technical engineering, social and/or environmental terminology. Education, profession and literacy levels will be considered when deciding on levels of detail, style and substance. All documentation will specify the date and venue of the public exhibitions and details of a contact person to whom written consultation comments should be directed: this should be either a contact at Uz-Kor or the LEC. Consultation comments can be received up to and including the date of the public exhibitions. All comments will be summarised and logged in a spreadsheet and then fed back to the IEC ESIA specialist team to inform their assessments	Uz-Kor, LEC

3	**Advertising the Exhibitions** The Community Leaflet should be distributed to households one week prior to scheduled date of exhibition. At the same time details of the exhibitions should also be announced in the local media. Small adverts should be placed in two local newspaper media where possible.	Uz-Kor, LEC
4	**Location of Exhibitions** It has been agreed through discussion between the LEC and IEC that the public exhibitions should be held in the following locations: • Muynak; • Kungrad; and • Kyrkkyz / Akchalak settlement.	Uz-Kor, LEC
5	**Number and Timing of Exhibitions** One public meeting should be held at each of the desired locations on consecutive days (i.e. Wednesday ay Muynak, Thursday at Kungrad, Friday at Kyrkkyz / Akchalak). These should be held at least one week following distribution of the community leaflets and NTS documents. The specific hours of the exhibition should be decided at the discretion of the LEC in consideration of local working and social cultures.	Uz-Kor, LEC
6	**Private Meetings** The IEC recommends that private meetings be held to introduce the Project to a number of parties, where applicable, including: • Local Government Bodies; and • NGOs. Stakeholders should be provided with a copy of the Scoping NTS Report one week in advance of the date of the private meetings in order to allow them to familiarise themselves with the Project and also prepare their response. Stakeholders should also be invited to attend the public exhibitions.	Uz-Kor, LEC

7	**Action Plan** The following schedule details all requirements on behalf of Uz-Kor and the LEC in relation to PCDP activities:	Uz-Kor, LEC, IEC

PCDP Activity	**Date Required**	**Responsibility**
IEC submit PCDP Documentation to Uz-Kor	20 May 2010	IEC
Uz-Kor agree contract with LEC for undertaking of PCDP activities	28 May 2010	Uz-Kor, LEC
Logistical Preparation for Public Exhibitions (translation of Scoping NTS documentation ; arranging suitable venues for public exhibitions ; arranging private meetings ; public exhibition poster preparation ; etc.)	4 June 2010	LEC
Distribution of Scoping NTS documentation	7 to 9 June 2010	LEC
Private meetings held	7 to 11 June 2010	Uz-Kor, LEC
Public exhibitions held	14 to 16 June 2010	Uz-Kor
Completed consultation log submitted to Uz-Kor	25 June 2010	LEC
Consultation log translated from Karakalpak / Uzbek / Russian – English	2 July 2010	Uz-Kor
Consultation log (English version) submitted to IEC	2 July 2010	Uz-Kor

Annex B - Scoping NTS – English Version

Introduction

The Uzbek-Korean Joint Venture (JV) "Uz-Kor Gas Chemical" LLC (hereafter referred to as 'Uz-Kor') is currently developing the Surgil project which involves the expansion of the Surgil gas field and the construction of the Ustyurt Gas Chemical Complex (UGCC) for production of petrochemical products. Uz-Kor has commissioned an international consultancy Mott MacDonald Ltd (MML) to conduct an international Environmental and Social Impact Assessment (ESIA) and produce an associated ESIA Report and an Environmental and Social Action Plan (ESAP) for the Surgil Project (hereafter referred to as 'the Project'). The construction and operation of the Project may result in a variety of both positive and negative environmental and social impacts. The purpose of the ESIA is to assess and manage these potential impacts.

This non technical summary was produced to inform the public and wider stakeholders of the Project, its surroundings and the ESIA process and potential issues. Details on how the public can comment on the Project are provided at the end.

Project Description and Location

The Project involves the development of three distinct yet interrelated components:

- Drilling of gas production wells and the construction and expansion of associated production infrastructure for the Surgil, North and East Berdakh Fields, including a Complex Gas Treatment Unit (CGTU) at the Surgil Field (the 'Surgil CGTU') and another CGTU shared between the North and East Berdakh Fields (the 'East Berdakh CGTU');
- The construction and operation of the UGCC and associated infrastructure (i.e. workers camp, rail connection, motor road connection, raw water supply line connection, sales gas pipeline, wastewater pipeline and disposal area and electrical power line connection, etc.) on the Ustyurt Plateau for the production of high-density polyethylene and polypropylene and export of sales gas; and
- Construction and operation of below ground gas and condensate pipelines to connect the Surgil Field to the new UGCC, tie in of the existing sales gas pipeline from East Berdakh CGTU to the Surgil gas pipeline and the construction and tie in of a new condensate pipeline linking the East and North Berdakh Gas Fields to the new Surgil condensate pipeline.

Construction and drilling operations for the gas field and pipeline components of the Project commenced in 2007. Construction and development of the UGCC is expected to commence in 2011.

The northern extent of the Project location, comprising the Surgil, North and East Berdakh Fields, and the northern section of the pipeline route, is located to the south of the existing Aral Sea. The gas fields are therefore located within the former footprint of the Aral Sea. The area is characterised by flat, dry arid plains and is low in vegetation cover. The plains are typically of high salinity and, in some cases, are understood to contain toxic elements. The southern extent of the Project, comprising the UGCC and southern section of the pipeline route, is located on the Ustyurt Plateau. The plateau in the vicinity of the Project site consists primarily of flat, monotonous stony desert and drops sharply to the plains below, presenting a cliff-like appearance.

Environmental and Social Regulations and Standards

As Uz-Kor is potentially seeking international finance, the Project is being developed in accordance with both national and international environmental and social regulations and standards. Regulation No. 491 (31 December 2001) on State Environmental Expertise (SEE) defines the legal requirements for environmental impact assessment (EIA) in Uzbekistan. According to the definition provided in Appendix 2 of Regulation 491, the Project is deemed to be Category 1 – High Risk.

Methodology

The international ESIA process will involve collecting baseline data relating to a range of physical, biological, socio-economic and community factors in the local area. A diverse range of positive and negative effects arising from the construction, operation and decommissioning of the Project will be assessed to determine their significance and how they can be mitigated or managed. The significance of the effects that will arise in each of these phases is based on any changes compared to the baseline conditions (i.e. those conditions which would exist if the proposals did not go ahead). The identification of residual significant effects will take account of any incorporated mitigation measures adopted by the Project, and will be largely dependent on the extent and duration of change, the number of people or size of the resource affected and their sensitivity to the change.

Consultation

Stakeholder consultation is an essential part of the ESIA process. The ESIA will be informed by the outcomes of consultation activities that will be guided by the Public Consultation and Disclosure Plan (PCDP) for the Project. The PCDP has been designed to guide public consultation and disclosure activities up to the completion of the ESIA Report. All PCDP activities and outcomes, in the form of comments raised by stakeholders and how they were addressed in the ESIA, will be summarised in the final ESIA Report. In order to comply with international finance standards, high level recommendations for public consultation and disclosure beyond the ESIA and throughout the lifecycle of the Project will be provided in the ESAP.

Assessment Topics

Ecology and Nature Conservation

Potential ecological impacts will include: habitat loss; disturbance to habitats and species; and opening up of the area for increased hunting and fuel wood clearance (e.g. as a result of increased road infrastructure). It will be necessary to agree and clearly delineate minimum working areas both for the construction and operational phase. The ESIA assessment will focus on major threats to fragile habitat and protected/endangered species taking into account values attached to biodiversity by specific stakeholders.

Hydrology and Hydrogeology

Throughout the area and in all aquifers, salinity is a significant constraint on groundwater use without treatment. Groundwater and possibly surface waters are potentially at risk of contamination from the construction, commissioning and operational activities of the Project facilities. The impact assessment undertaken for the ESIA will: identify and quantify all Project water use requirements and the proposed source of supply; identify and quantify Project wastewater streams and proposed methods for treatment

and disposal; assess the likely impacts of Project water demand on surface and groundwater resources; and assess options to minimise the amount of water used, the wastewater generated, the disposal option and the overall environmental impact of each option.

Geology and Contaminated Land

Construction and operational phase impacts may include: physical impacts due to earth moving; subsidence; contamination of soil and groundwater; and impacts arising from drilling and gas production operations. Contamination impacts will be evaluated to define viable pollutant linkages; the risk assessment will consider the possible impacts of the pollutant linkages to both human health and to environmental receptors.

Air Quality and Climate

The Kyrkkyz/Akchalak settlement is located approximately 5 km south-west of the UGCC site; Uchsay settlement lies to the south-east of the Surgil Field CGTU, approximately 15 km north-east of Muynak. A qualitative assessment will be used to assess the potential effects of construction activities. Operational emissions will be assessed in accordance with international guidelines. Emissions from significant operational point sources will be assessed quantitatively for the UGCC, in addition to the sources associated with the Surgil and East Berdakh CGTUs. As impacts are likely to be limited to a 10 km radius of any point sources this will form the study area.

Carbon Assessment

Emissions of greenhouse gases (GHGs) will arise from the construction and operation of the Project facilities, particularly the UGCC and the Surgil and East Berdakh CGTUs. Construction phase GHG emissions will be addressed qualitatively through the identification of relevant mitigation and management measures to improve energy efficiency as far as practicable. The assessment will attempt to quantify the emissions of GHGs arising from the various sources in the operational phase that are a direct consequence of the Project.

Noise and Vibration

The gas fields and UGCC will be set in rural locations with few neighbouring settlements, the most notable of which is Kyrkkyz/Akchalak. Impacts on the nearest sensitive receptors may be attributed to construction and decommissioning activities, including traffic effects, and to operational noise including transportation effects from the UGCC. The potential impacts of vibration generated during all phases of the Project are not anticipated to be perceptible due to the transmission distances to the nearest sensitive receptors. As such, an assessment of vibration will not form part of the ESIA.

Waste Management

Appropriate waste management, minimisation and disposal practices will be required for all construction and operation related solid, liquid, hazardous, non hazardous and inert wastes. It is understood that there are insufficient hazardous waste disposal or treatment facilities available within the Project area. A high level review of international standards will be conducted to identify the necessary management and monitoring measures required to achieve waste avoidance, recovery and disposal for the Project.

Traffic and Transport

Increases in traffic movements will be most significant during the construction phase at all Project locations to enable transfer of workers and plant / materials to site. Once operational, export of materials from the UGCC will also be transported via road and rail. The Project will require the development of a new private road running in parallel with the pipelines from the gas fields to the UGCC. In addition, approximately 38 km of new road will be constructed to link the Surgil CGTU with the East Berdakh CGTU and approximately 5 km road and rail links will be required to connect the UGCC site with the existing road and rail network. A transportation assessment will be undertaken as part of the ESIA to identify and evaluate the impacts of the Project on traffic and transportation.

Landscape and Visual

Impacts during construction will be temporary in nature within a remote setting. Significant landscape and visual impacts are not envisaged for the pipelines during operation as they will be buried. One of the first steps of the assessment will be to establish and map a precise engineering / design baseline in order to appreciate the Project design and dimensions. The assessment will primarily focus on the UGCC during both construction and operation. Consideration will also be given to the construction of the pipelines and drilling within the Surgil, North and East Berdakh Fields.

Cultural Heritage

Two historical monuments and three ancient burial grounds are located in the proximity of Project. It can be expected that further isolated monuments and burial grounds will likely be present across the plateau. Further information will be collated and cross-referenced to a map highlighting all archaeological and cultural heritage features within the zone of influence to confirm the initial assessment undertaken. Where necessary, consultation will be undertaken with relevant cultural heritage bodies.

Social Impact Assessment

During the IEC site visit the implementation of the PCDP was initiated through conducting meetings with key stakeholders to discuss social issues. During the ESIA assessment, primary data collected from site visits and consultation outcomes will be analysed to inform the social impact assessment. Additional desk-based data collection and analysis will also be undertaken. The assessment will consider the wider socio-economic benefits to the local communities, region and Uzbekistan, including potential improvements to the local water supply and other community investment opportunities. Adverse and beneficial social impacts will be identified and broadly assessed.

Environmental and Social Management and Monitoring Plan

Production of an effective mechanism to manage, mitigate, and monitor environmental and social impacts during the Project will be provided through the use of Environmental and Social Management and Monitoring Plans (ESMMPs) for both the construction and operational phases of the Project. The ESMMPs will consist of mitigation, management, monitoring and institutional measures used to eliminate, offset or reduce negative environmental and social impacts to acceptable levels.

How to comment on the Project

Stakeholder consultation is an essential part of the international assessment process. Public feedback on the Project is invited as follows:

- In person at a public exhibition;
- Via the Project website or
- As written comments or via telephone to the following:

International Business Centre
107B Amir Temur Street
Tashkent 100084
Uzbekistan

Annex C - Scoping NTS Community Leaflet – English Version

Introduction

The Uzbek-Korean Joint Venture (JV) "Uz-Kor Gas Chemical" LLC (hereafter referred to as 'Uz-Kor') is currently developing the Surgil project which involves the expansion of the Surgil gas field and the construction of the Ustyurt Gas Chemical Complex (UGCC) for production of petrochemical products. 'Uz-Kor' is conducting an international Environmental and Social Impact Assessment for the Surgil Project ('the Project'). The construction and operation of the Project may result in a range of both positive and negative environmental and social impacts. The purpose of the assessment is to evaluate and manage these potential impacts appropriately. As Uz-Kor is potentially seeking international finance support, it is important that the assessment meets national and international lending requirements.

Project Description and Location

The Project involves the development of three component parts:

- Drilling of gas production wells and construction of associated infrastructure at the Surgil, North and East Berdakh Gas Fields, south of the existing Aral Sea;
- Construction and operation of the Ustyurt Gas Chemical Complex near the Kyrkkyz/Akchalak settlement on the Ustyurt Plateau, and associated infrastructure; and
- Construction and operation of below ground gas and condensate pipelines to connect the gas fields to the Gas Chemical Complex.

Importance of Project

At present, Uzbekistan imports polypropylene and some polyethylene polymers for use in manufacture. Investments made in this Project for the production of these products could reduce the need for import. The natural gas resources of the Project gas fields provide an opportunity for the provision of natural gas raw material for the Gas Chemical Complex. The development of the Project will make a significant contribution to the local and national economies of Karakalpakstan and Uzbekistan through both job creation and the sale and the export of the polymer products and sales gas to national and international markets.

Environmental and Social Impacts

The international assessment process will consider a diverse range of positive and negative environmental and social effects arising from the construction, operation and decommissioning of the Project. Mitigation and management measures used to eliminate, offset or reduce negative environmental and social impacts to acceptable levels will be integrated within an action plan to be implemented following the completion of the assessment over the lifetime of the Project.

How to Comment on the Project

Stakeholder consultation is an essential part of the international assessment process. Public feedback on the Project is invited as follows:

- In person at a public exhibition
- Via the Project website; or
- As written comments or via telephone to the following:

12th Floor
International Business Centre
107B Amir Temur Street
Tashkent 100084
Uzbekistan

Annex D - Correspondence Log Template

Name	Organisation	Website	Tel no.	Fax no.	Email address	Type correspondence	Date correspondance	Stakeholder comments	Response necessary?
						e.g. letter, email, phone call, etc.			

Appendix F. Press Releases

F.1. Press Releases

Объявление в газету

СП ООО «Uz-Kor Gaz Chemical» совместно с ОАО «УзЛИТИнефтегаз» и УДП «Устюртгаз» проводят Встречи с представителями общественности (заинтересованные лица, специалисты, организации) по обсуждению проекта «Сургиль», который включает разработку газовых месторождений и строительство Устюртского газо-химического комплекса (УГХК) для производства нефтехимической продукции.

Общественные консультации и раскрытие информации будут проведены в рамках работы Общественных приемных по следующему графику:

1) 21 июля в Хокимияте г. Кунград

2) 22 июля в махаллинском комитете п. Акчалок

3) 23 июля в Хокимияте г. Муйнак.

Время работы с 14-00 до 20-00 час.

Приглашаем принять участие в данной Встрече всех заинтересованных лиц.

Контактное лицо:

СП ООО «Uz-Kor Gaz Chemical»
Касымов А.А.
Адрес:
e-mail:
Тел: (998 71) 238 9223

Объявление в газету

«Uz-Kor Gaz Chemical» МЧЖ ҚҚ «ЎзЛИТИнефтегаз» ОАЖ билан ва «Устюртгаз» ШК биргаликда «Сургил» лойихасини мухокамаси бўйича жамоат вакиллари (манфаатдор томонлар, мутахассислар, ташкилотлар) билан учрашув ташкил этмоқда. «Сургил» лойихаси ўз ичига газ конларини ўзлаштириш ва нефт-киме махсулотларини ишлаб чиқариш учун Устюрт Газ Киме Комплексини қуришни камраб олади.

Жамоатчиликни қабул қилиш доирасида, Жамоатчилик билан учрашув ва маълумотларни ошкор қилиш ишлари қуйидаги манзил буйича ўтказилади:

21 июл куни Қўнғирот ш. Хокимияти биносида;

22 июл куни Акчалок п. Махалла қўмитаси биносида;

23 июл куни Муйноқ ш. Хокимияти биносида.

Ишлаш вақти 14-00 дан 20-00 гача.

Барча манфаатдор томонларни мазкур тадбирда иштирок этиш учун таклиф этамиз.

Маълумот учун:

«Uz-Kor Gaz Chemical» МЧЖ ҚҚ
Қосимов А.А.
Манзил:
e-mail:
Тел: (998 71) 238 9223

A joint Venture between Uz-Kor Gas Chemical together with Uzbekneftgaz and Ustyurt gas will hold meetings with representatives of the public (stakeholders, experts, organizations) to discuss the proposed Project, which includes the development of gas fields and construction of a petrochemical facility.

Public consultation and disclosure will be held in a series of public receptions during the following schedule:

1) July 21, Mayor Office, Kungrad

2) July 22 neighbourhood committees etc. Akchalak

3) July 23, the Mayor Office, Muynak.

Opening hours from 14-00 to 20-00 hours.

We invite all interested partied to participate in this meeting.

Contact:

JV «Uz-Kor Gaz Chemical»

Kasimov, AA

Tel: (998 71) 238 9223

года шел по улицам Манхеттэна, разговаривая по "сотке", у нас росли очереди на подключение к проводной телефонной связи.

С достижением независимости, как и во всех сферах, проведена широкомасштабная работа по развитию телефонной связи. Прямо из дома вы можете без каких-либо трудностей связаться с любой точкой планеты. Цифровые АТС, оптико-волоконная телефонная сеть полностью отвечают международным стандартам.

Только в первом полугодии 2010 года 1046 сельских врачебных пунктов были обеспечены средствами связи стандартов GSM и CDMA с бесплатными входя-

— До независимости в нашем селе, где проживало более ста семьей, имелось всего два телефона, — говорит жительница аула Дустлик Берунийского района Каракалпакстана Таджигуль Уразбаева. — Один — в доме председателя, другой — у продавца магазина. А сегодня? Почти каждый член каждой семьи имеет по телефонному аппарату, некоторые пользуются двумя сразу. Таким возможностям нельзя не радоваться.

Действительно, предоставленных независимостью возможностей не перечесть.

О.РАДЖАБОВ,
обозреватель УзА

ство в очень небольшой орган человека достаточно серьезное. Представьте себе, глазное яблоко размером в два сантиметра разрезается почти наполовину. В связи с этим и послеоперационный, восстановительный период затягивается, возможны и осложнения. На смену этому методу, использовавшемуся несколько десятков лет и, надо отдать должное, благодаря которому по всему миру было возвращено зрение десят-

Нефтегазовая отрасль

ВАЖНАЯ ВСТРЕЧА

В нашей республике проводится значительная работа по изысканию полезных ископаемых и их целесообразного использования.

В этом направлении между Республикой Узбекистан и Южной Кореей ведется плодотворное сотрудничество.

Проект "Сургиль", который разработало совместное предприятие ООО "Узкоргазкеминал" Узбекистан — Южная Корея, направлен на дальнейшее расширение газового месторождения "Сургиль", строительство Устюртского газохимического комплекса (УГХК). К разработке этого проекта была привлечена международная консалтинговая компания "Мотт Манн Дональд Лимитед".

Строительство УГХК намечено начать в 2011 году. Когда комплекс заработает на полную производственную мощность, работой будет обеспечено от одного до четырех тысяч человек.

На недавней встрече, которая была посвящена этим вопросам, стало известно, что работники нового комплекса будут обеспечены жильем со всеми удобствами, а рядом с УГХК будут построены школа, детский сад и другие объекты социально-культурного назначения.

Выступившие на встрече в пос. Акшолак представители Кунградского и Муйнакского хакимиятов, специалист СП ООО "Узкоргазкемикал" А.Касымов, руководитель отдела промышленности и экологической безопасности предприятия "УзЛИТИ нефтегаз" Хегай, сотрудники совместного предприятия А.Абатов, П.Ибрагимова, У.Абдуллаев дали пояснение участникам встречи об особенностях и преимуществах нового строительства нефтегазохимического комбината.

Представителями СП "Узкоргазкемикал", ОАО "УзЛИТИ нефтегаз", унитарного предприятия "Устюртгаз" совместно с сотрудниками Совета Министров Республики Каракалпакстан было дано полное пояснение руководителям предприятий и учреждений, участвующим в новом проекте "Сургиль", а также широкой общественности о ходе разработок газовых месторождений и строительства УГХК.

З.ХОЖАНИЯЗОВ,
корр. ККИА

О том, какая всесторонняя помощь оказывается нашим государством развитию малого и частного предпринимательства в печати говорилось немало. За годы независимости вышел ряд законодательных актов в поддержку частного сектора экономики. Благодаря этому с каждым годом увеличивается его вклад в ВВП экономики страны. Помощь помощью, но и руководители частных предприятий, в свою очередь, должны быть деловыми, инициативными, с соответствующими организаторскими способностями.

Думаем, что руководитель ООО "Шераб текстиль" Элликкалинского района Шерзод Абдуллаев вполне

Частное

ЦЕЛЬ – РАСІ

обладает этими качествами. Хотя его частное предприятие открылось только в прошлом году, оно уже прочно стало на ноги. Яркое свидетельство этому — на сегодняшний день трудовой коллектив общества выпускает швейную продукцию до 50 наименований. В просторном цеху, оборудованном 25 швейными машинами российского производства, работают 20 человек. Здесь шьют мужскую и женскую одежду, элитные гардины, чехлы и накидки для мягкой мебели и прочие швей-

Сельское

Фермерское хозяйство "Шорахан-Шамшет", расположенное на территории Турткульского района, было создано в 2005 году. Руководит хозяйством опытный, с большим стажем работы в аграрном секторе, профессионал своего дела Бахтияр Аминов. На сегодня члены его хозяйства, доставив на приемный пункт более 30 центнеров зерновых с пшеничных полей общей площадью 28,4 гектара, выполнили свои договорные обязательства. Еще одной трудовой победы достигли работники вышеназванного фермерского хозяйства. Выростив шелкопряды из 22 ко-

Пусть здравствует дружба народов!
ВЕСТИ КАРАКАЛПАКСТАНА
Суббота, 21 мая 2005 года
№44(6952)
Издается с июня 1919 г.
Газета Жокарғы Кеңеса и Совета Министров Республики Каракалпакстан

ВЕСТИ КАРАКАЛПАКСТАНА

Пусть здравствует дружба народов!

Вторник, 3 августа 2010 года №62 (17530)

Издается с июня 1919 г.

Газета Жокаргы Кенеса и Совета Министров Республики Каракалпакстан

www.erkinkk.kr.uz

ЦЕНА СВОБОДНАЯ

В ЗАКОНОДАТЕЛЬНОЙ ПАЛАТЕ ОЛИЙ МАЖЛИСА

29-30 июля состоялось очередное заседание Законодательной палаты Олий Мажлиса Республики Узбекистан. Депутаты утвердили повестку дня, предложенную Кенгашем Законодательной палаты.

Основная часть вопросов, внесенных на рассмотрение нижней палаты парламента, касалась судебно-правовой сферы, укрепления законности и правопорядка, обеспечения прав и законных интересов граждан.

В числе этих вопросов особое место занимает проект Закона "О профилактике безнадзорности и правонарушений среди несовершеннолетних", который представил председатель Комитета по демократическим институтам, негосударственным организациям и органам самоуправления граждан . Саидов. Актуальность данного законопроекта особенно значительна в год, который объявлен в нашей стране Годом гармонично развитого поколения. Законопроект направлен на регулирование отношений в области профилактики безнадзорности и правонарушений среди несовершеннолетних. Принятие специального закона в этой сфере позволит поднять на новый уровень эффективность воспитательной работы среди подрастающего поколения. Разработка такого законопроекта еще раз показывает особое внимание, которое уделету поручено доработать проект закона с учетом принятых поправок и внести его на рассмотрение в третьем чтении.

Проект Закона Республики Узбекистан "О внесении изменений и дополнений в некоторые законодательные акты Республики Узбекистан" также направлен на обеспечение законных прав и интересов субъектов залоговых отношений. О нем депутатам доложил председатель Комитета по законодательству и судебно-правовым вопросам Н. Исмаилов. Целью законопроекта является закрепление правовых норм, предусматривающих защиту интересов кредиторов в залоговом правоотношении, а также приведение отдельных норм законодательных актов в соответствие между собой. В проекте закона предложены положения по приведению отдельных норм Закона "Об исполнении судебных актов и актов иных органов" в соответствие с Законом "Об ипотеке", а также внесение изменений в Гражданский кодекс Республики Узбекистан и Закон "Об ипотеке", направленных на совершенствование законодательства. В ходе постатейного обсуждения законопроекта выступили представители всех фракций политических партий. Представители фракции Движения предпринимателей и деловых людей — Либерально-демократической партии Узбекистана обратили внимание на то, что залог имеет особую значимость для развития и успешного функционирования страны.

После ответов на вопросы состоялось обстоятельное обсуждение документа. В ходе постатейного рассмотрения представители парламентской фракции Социал-демократической партии Узбекистана "Адолат" отметили, что законопроект направлен на укрепление института нотариата, призванного обеспечить охрану и защиту прав и законных интересов физических и юридических лиц, оказание населению квалифицированной юридической помощи. В связи с этим особое внимание уделяется квалификационным требованиям нотариусов, повышению их ответственности при выполнении своих обязанностей. Поэтому четкая организация системы нотариата будет способствовать стабильному установлению законности в этой сфере. С учетом мнений, высказанных в ходе обсуждения, Законодательная палата приняла проект закона во втором чтении.

На дальнейшую реализацию судебно-правовой реформы и либерализацию уголовного законодательства направлен проект Закона "О внесении изменений и дополнений в Уголовный и Уголовно-процессуальный кодексы Республики Узбекистан", внесенный на рассмотрение депутатов в первом чтении Комитетом по законодательству и судебно-правовым вопросам. В нем предусматривается дальнейшее совершенствование механизма освобождения граждан от уголовной ответствен-

ки Узбекистан от 8 января 2010 года "О мерах по дальнейшей модернизации системы налоговых органов". В законопроекте предусматривается внесение поправок в отдельные статьи Уголовно-процессуального, Налогового кодексов Республики Узбекистан, законов "О государственной налоговой службе", "О гарантиях свободы предпринимательской деятельности", "О государственном контроле деятельности хозяйствующих субъектов".

В ходе постатейного обсуждения законопроекта выступили представители всех фракций политических партий и депутатской группы от Экологического движения Узбекистана. Они отметили, что изменения и дополнения в некоторые законодательные акты страны вносятся с целью наведения порядка в местах временного хранения автотранспортных средств, контроля за поступлением арендной платы, использованием контрольно-кассовых машин, расчетных терминалов, соблюдением правил торговли и оказанием услуг на территориях рынков, торговых комплексов и прилегающих к ним территориях. С учетом предложений, внесенных в ходе обсуждения, Законодательная палата приняла закон, который будет направлен в Сенат Олий Мажлиса.

В первом чтении был рассмотрен законопроект "О внесении изменения и дополнения в статью 113 Таможенного кодекса Республики Узбекистан" об адми-

На обеспечение гарантированных интересов граждан в социальной сфере направлен проект Закона Республики Узбекистан "О внесении изменения и дополнений в Кодекс Республики Узбекистан об административной ответственности", внесенный на рассмотрение Законодательной палаты в первом чтении. О нем депутатам доложил член Комитета по труду и социальным вопросам К.Эргашев. Проектом закона предусматривается введение законодательных норм об административной ответственности за нарушение требований законодательства об обязательном страховании гражданской ответственности работодателя. В ходе состоявшегося обсуждения выступили представители всех фракций политических партий. Члены фракции Народно-демократической партии Узбекистана особо подчеркнули, что принятие данного закона создаст нормативно-правовую базу для обеспечения контроля за исполнением работодателями установленных законодательством требований по обязательному страхованию ответственности. Законодательная палата одобрила основные положения закона и приняла его в первом чтении.

Законодательная палата рассмотрела в первом чтении проект Закона Республики Узбекистан "Об информационно-библиотечной деятельности", который представила член Комитета

Узбекистан — глазами зарубежных гостей

«МОЛОДЕЖЬ УЗБЕКИСТАНА ОБЛАДАЕТ ВЫСОКИМ ИНТЕЛЛЕКТУАЛЬНЫМ ПОТЕНЦИАЛОМ»

Благодаря своим историческим памятникам, национальной культуре и традициям, живописной природе и современным городам наша страна привлекает к себе множество иностранных туристов. Корреспонденты УзА поинтересовались впечатлениями некоторых из них.

Со Чанг ХА (Южная Корея):

— Я приезжал в Ташкент четыре года тому назад, чтобы участвовать в форуме деловых людей. Ваша страна интенсивно развивает связи с внешним миром, в том числе экономическое сотрудничество. Высокий политический авторитет и экономический потенциал Узбекистана широко признаны в мире.

Узбекистан — страна с великим будущим. Хотел бы особо отметить, что свободная индустриально-экономическая зона "Навои" способствует увеличению производства конкурентоспособной продукции на мировом рынке, созданию дополнительных рабочих мест, дальнейшему повышению благосостояния народа. Отрадно, что сотрудничество и дружеские узы между Южной Кореей и Узбекистаном все более укрепляются.

Блас ВАРГАС (Испания):

— Я впервые приехал в Узбекистан. Стоит позавидовать спокойной и благополучной жизни, миру и стабильности, которые царят в этой прекрасной стране. Побеседовал с жителями Ташкента и Самарканда. Они очень довольны своей жизнью. Меня поразили исторические памятники Узбекистана, множество величественных зданий, сочетающих в себе традиции национального и современного зодчества.

В Узбекистане создана благоприятная инвестиционная среда, большие возможности и льготы для зарубежных деловых кругов. Ярким тому подтверждением является расширение связей Узбекистана с внешним миром, реализация крупных проектов при сотрудничестве с многочисленными госу-

развивается благодаря дальновидной и мудрой политике Президента Ислама Каримова.

Выдающиеся мыслители, рожденные на этой священной земле, внесли большой вклад в развитие мировой цивилизации своим богатым научным, духовным и культурным наследием. Их благие дела сегодня достойно продолжают потомки.

Самым великим достижением вашего народа является царящая в стране мирная и спокойная жизнь, стабильно развивающаяся экономика. Все это, безусловно, привлекает внимание зарубежных туристов. Человек, побывавший в Узбекистане, мечтает приехать сюда вновь.

Иззат АМИР (Малайзия):

— Я часто приезжаю в Узбекистан. Каждый раз удивляюсь огромным преобразованиям, осуществляемым в области экономики, культуры, образования, туризма, информационных технологий и других сферах. У всех вызывает восхищение масштабная работа по развитию инфраструктуры городов, дальнейшему преобразованию облика вашей страны.

Я преподаю историю в школе города Кота-Бару. Ознакомившись с школами, лицеями и колледжами Узбекистана, стал свидетелем огромного внимания, уделяемого сфере образования. Национальная программа по подготовке кадров, Государственная общенациональная Программа развития школьного образования отличаются своим совершенством. Молодежь Узбекистана обладает высоким интеллектуальным потенциалом. Это является результатом широкомасштабных ...

Appendix G. Public Exhibition Photoreports

G.1. Overview

Photoreport
On Provision of Public Consultations and Information Disclosure (PCDP)
for Surgil Project

Kungrad
27 July 2010

Preparation works in premises before the public exhibition in Kungrad

Information disclosure to the interested person

Meeting with the representative of NGO Committee on Sudochye Lake System Management

Meeting with the local authority

Information on goals and targets of the proposed development

Public exhibition in Kungrad

Public exhibition in Kungrad

Meeting with local residents

Meeting with local residents

Consultations with local residents

Provision of consultations with Kungrad citizens

Meeting with local residents

Representatives of the local community

Local residents

Presentation of JV LLC Uz-Kor Gas Chemical representative on summary project technical information, expected positive and negative impacts of Surgil project for the local community

Mass media participation in public exhibition work

Provision of public exhibition in Kungrad

Open discussion on the development project

Discussion

Comments of local residents

Presentation of JV LLC Uz-Kor Gas Chemical for the local community

The local community

Comments of local residents

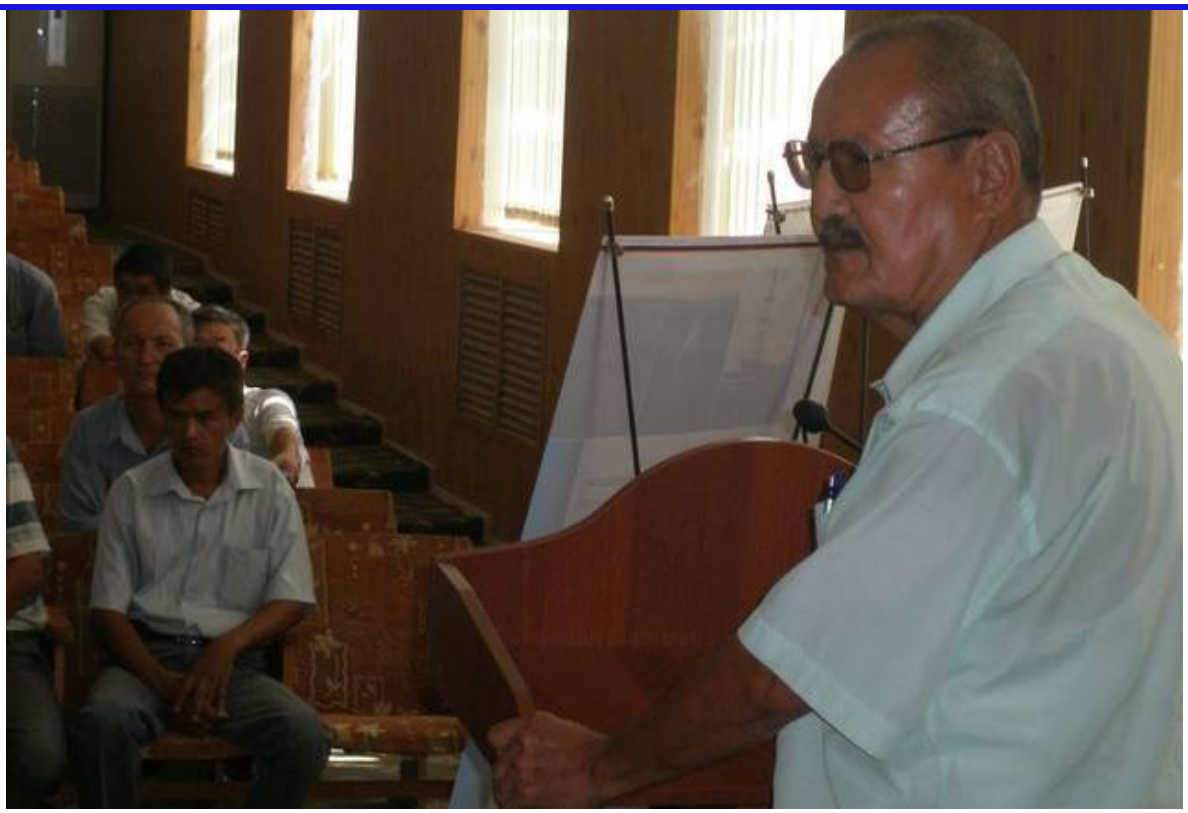
Kungrad citizens

Discussion with local residents

Representative of NGO Committee on Sudochye Lake System Management

Local residents

Presentation of :Local Environmental Consultant

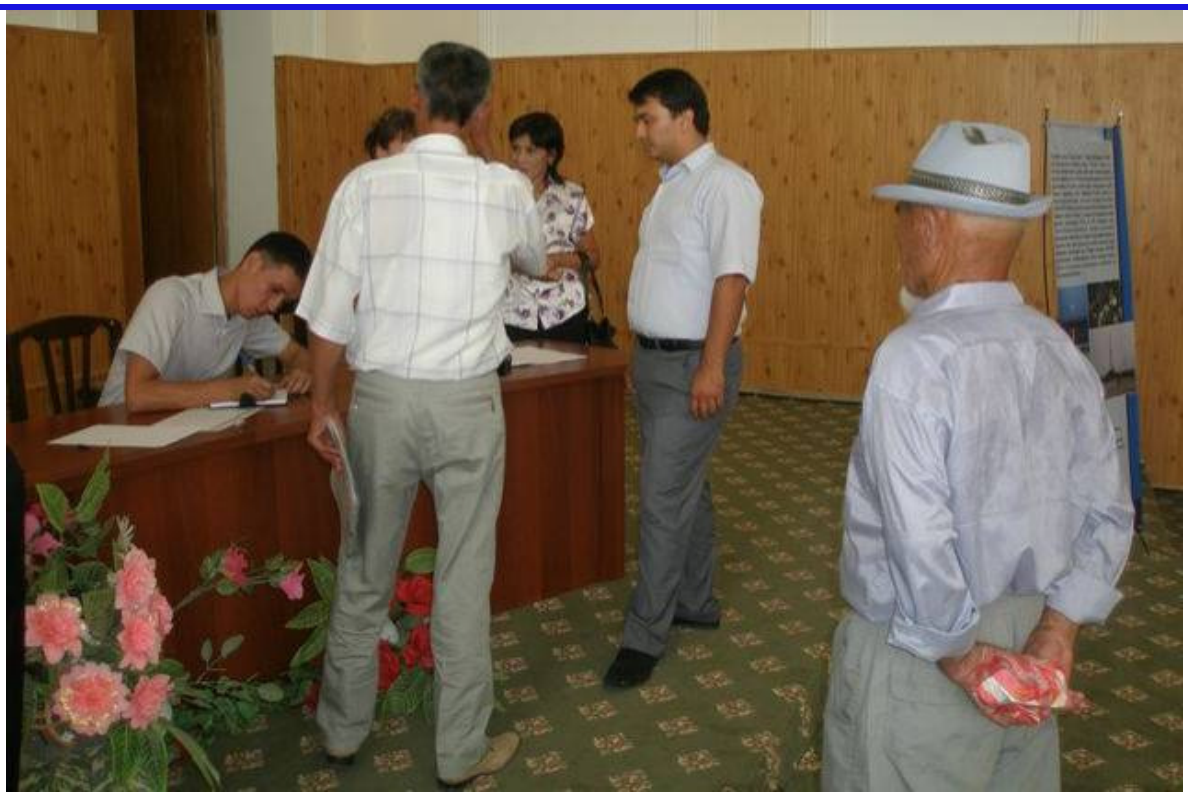


Speech of the Head of Writing Union

Speech of mass media representative

Consultations with local residents

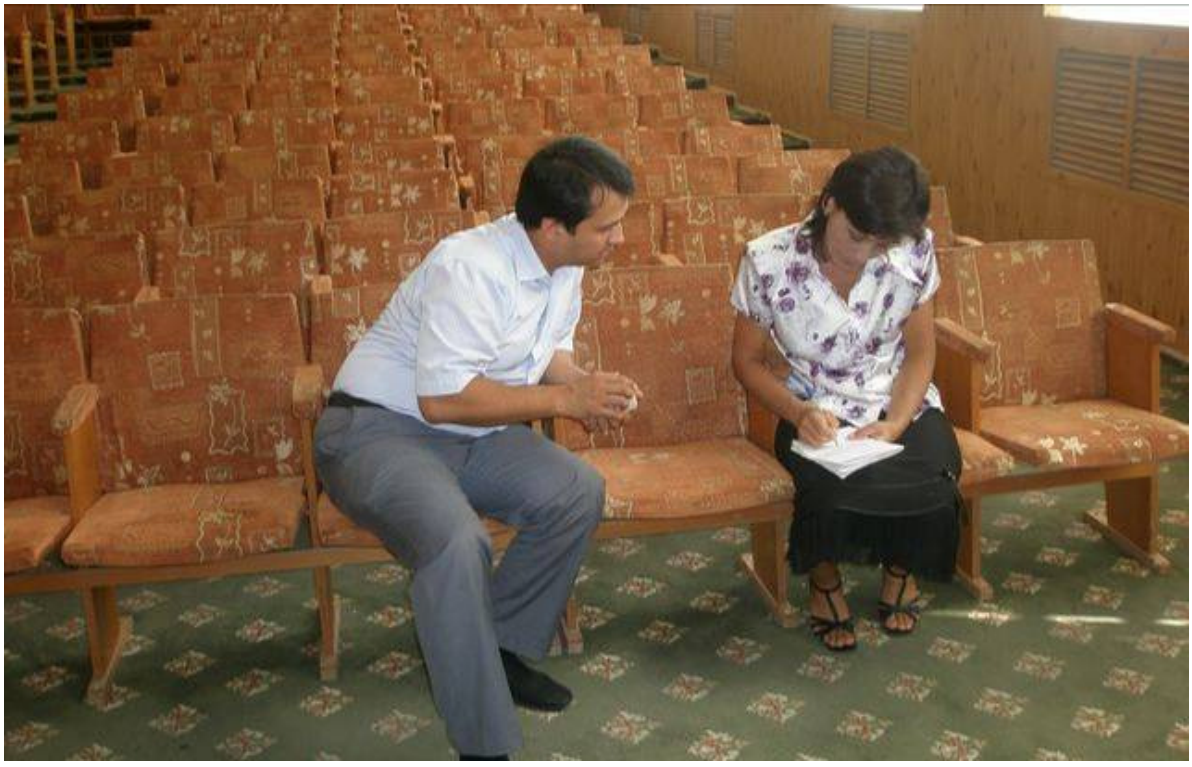
Local mass media representatives



Consultations with local residents

Consultations with local residents

Consultations with local residents



Meeting with the local TV representative

Photoreport
On Provision of Public Consultations and Information Disclosure (PCDP) for Surgil Project

Akchalak
28 July 2010

Preparation works in premises before the public exhibition in Akchalak

Public exhibition in the settlement Akchalak

Public exhibition in the settlement Akchalak

Local residents of the settlement Akchalak

The local community of the settlement Akchalak

Female population of the settlement Akchalak

Presentation of the summary project technical information, expected positive and negative impacts of Surgil project

Discussion of the Surgil project

Disclosure of the Surgil project information

Comments on Surgil project from the local residents

Open discussion on the project

Consultations with local residents

Operation of public exhibition in the settlement Akchalak

Public consultations with the local community

Photoreport
On Provision of Public Consultations and Information Disclosure (PCDP) for Surgil Project

Muynak
28 July 2010

Preparation works in premises before the public exhibition in Muynak

Public exhibition in Muynak

Public consultations provision in Muynak

The local public of Muynak

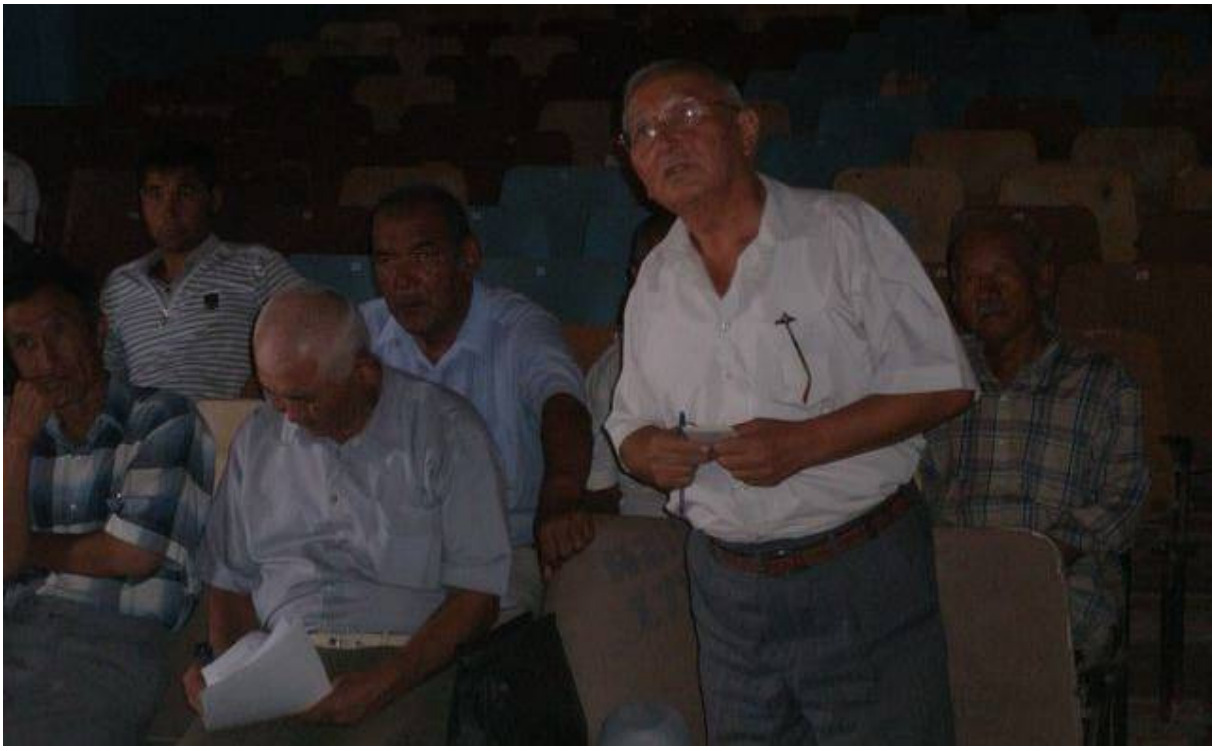
The local public of Muynak

Comment on Surgil project from a local resident

Speech of the local authority representative about Surgil project

Presentation of Uz-Kor Gas Chemical representatives

Muynak residents



Speech of the local authority representative about Surgil project

Public exhibition in Muynak

Public exhibition in Muynak

Appendix H. Ecology – Bird Migration Report

H.1. Bird Migration Report

Institute of Biology

Institute of Biology

742000, No'kis qalasi, Berdaq guzari 41 jai
tel:(361)222-10-93, 222-49-20. Fax: (361) 222-98-94.

742000, Nukus shahar, Berdoq shoh ko'chasi 41 ui
http://www.aknuk.uzsci.net/bioekologia.html

Information and answers to the list of queries concerning "Construction of Ustyurt GCC at Surgil field with field development" Project

The boundaries of the project area starting from the dried Aral Sea bed (Surgil) stretch to the Ustyurt escarpment (Akchalak settlement) and followed to Urga Cape and the vicinity of Sudochye lake.

While implementing environmental monitoring over the past 2007-2011years, we have obtained information on biological diversity at Ustyurt Plato (Akchalak settlement, Urga Cpae), dried Aral Sea (Surgil) and the vicinity of Sudochye lake.

The indoor research was conducted by way of recording of the birds using a 10-fold binoculars and 60-fold "Viking" pipe. The duration of research at the record point was ranged from 5 to 10 minutes. Different types of

For the determination of birds types the various indicators were used. Particularly, the Collins "Birds of Europe" indicator. The location of the observation points and landmarks were recorded using GPS Garmin.

The recording of saiga population was carried out ground method, visually, on the trail and trails of Saiga.

The Surgil area was formed on the dried parts of "Aralkum" saline desert in the northwestern part of the Aral Sea.

Dried bottom of the sea is represented by: sandy, loamy, sabulous and clayey soils. The salt marshes (march, meadow, marsh, cortical, puffy crust-puffy ball, the residual), sand deserts and sands are widely spread. The type of soil salinity is sulfate-chloride 0.76 - 4.71%.

Marine sediments with a thickness from 2 to 3 meters in the north-western part of the sea bed are polymictic coastal - marine and deltaic sands, north of latitude of Adjibay Gulf of siltstone deltaic origin.

Characteristic features of Surgil include: soil salinity and intense aeolian salt and dust spreader within a radius of 200-500 km and below, the main direction of which is the north-western part of the dried bottom. Total flow of dust-salt aerosol, based on the experts evaluation, within a radius of 100 km of water area is about 1,5 to 2,3 t/ha, in the area from 100 to 300 km - 0,6-1,0 t / ha.

Geology. Geological structure of the dried bottom defined by the presence in the north-western part of the ancient structure of sandstones interbedded with sands, overlapping layer of clay and marl with total capacity of more than 100m.

Among the deposits of the Quaternary system for genetic types dominated by alluvial - deltaic, marine and aeolian.

Fluvial - deltaic sediments of the Upper quaternary-modern age spread within the northern end of the Amu Darya delta, up to about abs. mark the surface of 52 - 53 m. The sediments have highly variable lithological composition, representing an alternation of sand and clay layers, rapidly succeed each other in the horizontal and vertical directions. The thickness of alluvial-deltaic sediments is typically less than 25 -30 m

Modern marine sediments compose the dried bottom of Aral Sea in the range of 52-53m to 40m. The bottom sediments of the sea and their material composition in the upper meters thick within the north-western part of the sea stacked clays. The clay is of the marine origin limestone and clay of gray, dark and black color.

Modern physiographic processes and phenomena are represented in the form of deflation, salinity and water logging, erosion and accumulation. Modern seismic activity is estimated at 5-6 points for average soil conditions.

Hydrogeology.

Hydrogeology conditions of the drained part of the Aral Sea bottom are determined by the presence of groundwater flow of the soil type from the Gulf of south - western part of the bottom to the sea. In this connection, ground water, in addition to the total flux occurs locally in the zone of aeration, and as it approached the modern shoreline, their level gradually rises.

Climate.

The northwestern part of the dried bottom characterized by a sharp continental climate, with sharp drainage, precipitation of a small amount of rainfall, hot summer, accompanied by dry wind. Spring is characterized by a cloudy windy and freezing weather with frequent dust storms. The maximum precipitation falls in spring. Winter is characterized by little snow. Snow cover is retained during average 20-30 days. Usually winter is snow-free. The annual amount of precipitation composes 95 - 131 mm.

The frost-free days last an average during 184-213 days. The average monthly temperature in January is -7,1, in July - 25.9, the annual - 9,8. The sum of positive temperatures is 4118^{0}C. The average annual absolute humidity of the air in January is 3,7^{0}C, in July 20.0, the annual 10.2.

In 2007 – 2008 the adverse climatic conditions, extreme heavy frost, snowfall, short term of snow cover, blown by the wind were observed. Climatic conditions of the dried bottom of the sea were characterized by severe frosts in winter (00-38^{0}C) poor snow cover, high summer insolation and temperature (+37 - +43 ^{0}C), the lack of water in the soil and air, evaporation was many times greater than the sum of annual precipitation (in 7,6-8,9 times).At Surgil area on the bottom of the Aral Sea in July 2009 the relative humidity at 2 pm was 21.8%, and by 6 am the next day was 84.3%, at noon to 3 pm that day again amounted to 19,9%. The winds from the north-west and occasionally from the southeast were dominated. The strongest winds were observed in spring (April-May), and occasionally in June.

The average monthly wind speed reaches 5,0-5,9 m / sec. The highest wind speed reaches 18-20m / s. In connection with the deposition of small amounts of precipitation, low cloud, high insolation, high temperatures and dry air, the evaporation far exceeds the amount of annual precipitation (7,9-9,3 times).

Soil. Dried sea bottom is represented by the ecosystems of sandy, loamy, sabulous and clayey soils. The following soil type is well spread: saline (march, meadow, marshy, cortical, puffy, crust-puffy, schor, obsolescent), desert sandy and sand.

Soil largely reflects the composition and structure of the sediments of the sea. Bottom sediments of the sea are products of river runoff formation shores, and eolian transport and dead organisms, 89.1% of the sediments belong to the product of river flow.

Bottom sediments of the sea consists of different types of sands and silts. Sand sediments are confined to the coastal zone, which is limited to approximately 10 m isobath, reaching maximum width in the eastern part of the dried bottom.

Soils composing the seabed under the action of sea waves undergo physical and chemical changes and are differentiated by grain composition. On the open sea coasts, where waves are repeated often and reach the highest points the larger particles (sand, gravel) are spread. In the bays (gulfs, lagoons) the fine particles of soil (clay loam) are dominated.

The difference in the physical properties of sandy and clay soil is in the basis of their specific water - salt regime. As such, in the sandy sea bottoms the ground mass of water-soluble salt is easier to move to the lower levels under the influence of atmospheric moisture. The upper horizons are relatively quick to desalinate and dry. Drained upper soil horizon is caught by the processes of deflation. Together with the dismemberment of the relief in the sick of deflation, in the blowout the layers of soil salinity were found. Therefore, the negative forms of relief may become not only sources of sand for the formation of sand dunes, ridges and hills, but the salt and saline particles. Consequently, in areas close bedding of heavily mineralized groundwater, the aeolian sand formations forms, despite the favorable water - physical properties, can long remain the saline, due to inflow of saline particles from the newly reclaimed areas and the surrounding deflation basins.

The clayey soils in shallow groundwater are characterized by relatively high humidity, less susceptibility to deflation and salt concentration in the upper horizons. Mineralization in the drained sea bottom is directly dependent on the concentration of sea water. If sea water is highly saline, the amount of salts in the soil horizon will be high.

Due to the dried bottom of Aral Sea the salinity of the soil is directly dependent on the distance of the water surface and groundwater levels. If the surface of the mirror - sea water is more than 40 - 60 km and the groundwater level is below 3 - 4 m, the topsoil horizon is slightly saline. When the level of groundwater is above 1,5 - 2,0 m the soil is strongly saline by hydrochloric sulfate. In the new dried basins and lagoons the groundwater salinity is very high. There has been a significant increase in chloride ions, sulphates, sodium and magnesium.

The relief of the area is uniform, with occasional Tamarix chokolaki with height of 2,0 - 2,5 m, diameter 4 - 6 m. Between the chokolaki the principal vegetation is almost absent, most of the area is without vegetation - salt marsh, which consists of rolling salty sand.

In the lower places, in chokolaka the following plant formation is spread: Tamarix hispida, with the participation of the oppressed individual species (*Salicornia europaea, Suaeda crassifolia, Bassia hyssopifolia, Climocoptera aralensis*). The number of tamarix chokolak is from 0,2 to 1,0 pc. In the lower places, where the precipitation is accumulated, there are (*Pragmites austra*lus) in a single item (*Carelina caspica, Atriplex fominii*). The biomass is negligible from 0,2 to 0,4 kg / ha.

The vegetation cover consists of svedovo-dzhingilovyh, annual-dzhingilovyh, dzhingilovo-reed, chernosaksaulovo-dzhingilovyh communities. Here there is a change of vegetation from solerosovo-orach to chernosaksaulovo-shrub. The floristic composition of the natural vegetation is very poor, with 17 species of higher plants. On the dry bottom (25-30 years) there is a Potashnikova vegetation (Halostachys caspica) with the rare participation of shrubs and annual grasses.

Pic.1. Sparse development of vegetation in saline soils

Currently the process of succession – development of xerophilous desert communities (halophytes, psammophytes, hydrophytes) at Surgil area is being proceed.

From 2003-2005. and up to date on Surgil the sowing seeds, planting seedlings only to the mass of black and Haloxylon kandyma for securing mobile salty sands produced by the employees of the Forest Resources of the Republic of Karakalpakstan and the Forestry Institute of the Republic of Uzbekistan has brought a positive results.

Pic.2. Seedlings of Haloxylon in Surgil

Pic.3. Adults species of Haloxylon

The landscape of this area is tightly connected to distribution of mammals of the dried bottom of Aral Sea. In the north - western part of Surgil the following major mammalian taxons are widely spread: *Hemiechinus auritus, Pipistrellus pipistrellus, Lepus tolai, Mus musculus, Nesokia indica, Meriones tamariscinus, Meriones meridianus, Rhombomys opimus, Canis aureus, Canis lupus, Vulpes vulpes;* рептилии - *Agama sanguinolenta, Eremias velox, Eremias inremedia* etc.

In this region we have recorded 31 species of birds, of which 4 species: Pallid Harrier *Circus macrourus* golden eagle *Aquila chrysaetos*, burial *Aquila heliaca*, Jack *Chlamydotis undulate are* included in the Red Book of Uzbekistan (2006).

During the research we have identified and recorded the following wintering species of birds - Buzzard *Buteo rufinus*, imperial eagle Aquila *heliaca*, gray lark *Calandrella rufescens*, black lark *Melanocorypha yeltoniensis*, white wagtail *Motacilla alba*, Common Starling Sturnus vulgaris, gray crow Corvus cornix, chaffinch *Fringilla coelebs*, etc.

The following sedentary birds were recorded: golden eagles *Aquila chrysaetos,* Common Kestrel *Falco tinnunculus*, crested lark *Galerida cristata*, black crow *Corvus corone*, Grey Shrike *Lanius excubitor*, tugai nightingale *Erythropygia galactotes*, tree sparrow *Passer montanus*.

After winter period in the project area the spring migration is starting. Particularly intensive departure of wintering birds usually begins in late February - early March: gray lark *Calandrella rufescens*, black lark *Melanocorypha yeltoniensis*, Common Starling *Sturnus vulgaris*, gray crow *Corvus cornix*, chaffinch *Fringilla coelebs*, etc.

From early March until May the arrival and flight of the following bird species was recorded: Pallid Harrier *Circus macrourus*, Jack *Chlamydotis* undulate, black-bellied sandgrouse Pterocles orientalis, green bee-eater Merops persicus, little lark Calandrella cinerea, sand-martin Riparia riparia, Black-headed Wagtail Motacilla fildegg, Isabelline chat Oenanthe isabellina, red-headed bunting Emberiza bruniceps etc.

Akchalak Settlement is located in the central part of Karakalpakstan Ustyurt between the radio relay link № 16 - № 19, ie, from Urga descent № 1 to the descent Kabanbai. The study area is bordered to the south Barsakelmes Basin, northern reaches of the fortress Beleuli, from the eastern escarpment stretches to the border of the Turkmen part of the Ustyrt. The total area is 2.6 million hectares. Surface is a broadly wavy plain, with random distributed tracts of Karatul sand massive, Kosbulak and restricted areas are occupied by reduced salt marshes Kosbulak, Kuanysh and southern Barsakelmes, as there are numerous takyrs an area of 0.7 - 60.2 ha

Akchalak surface is represented by the broadly plain, parts of which are interrupted by significant elevations and located between the major depressions.

The Soil cover differs significantly variegated, it is based consists of:
1. Gray-brown desert soils
2. Light-brown desert soils
3. Irrigated gray-brown soils
4. Takyr soil
5. Takyrs
6. Bozyngens, sandy soils and sands
7. Deserted sandy soils and sands
8. Alkai
9. Salt marshes

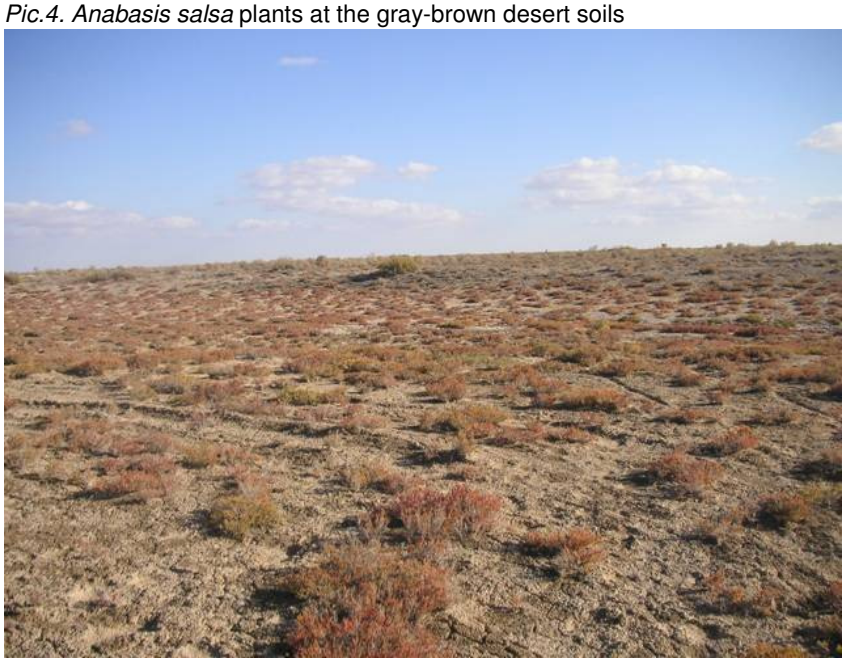
The climate is continental, characterized by hot, dry summers and fairly mild winters, accompanied by strong winds, low rainfall (70-110 mm / year), unstable snow cover, high evaporation and extreme changes in temperature on the season and during the day. The absolute maximum temperature is 45.50 C (July), minimum - 37.00 C (January).

In recent years, as compared to the years 1970-1980 with the deterioration of environmental conditions the long harsh winters and hot dry summers were observed. Rainfall has decreased by 20-30mm, the

groundwater has decreased by 3-12m depth. The salinity increased for 1,2-1,5 times. As a result the overall biological productivity of ecosystems in Ustyurt was decreased.

In floristic composition of Akchalak only 76 species of higher plants were recorded. The dominated boyalish-biyurgun association, black saxaul wormwood are spread in the limited area, herb-Polynov complexes occupies minor areas. Currently the vegetation area of Akchalak (Central Ustyurt) differs by distribution of halophilic and gypsumphillic plants. The natural and human impacts on vegetation and soil cover and grazing (changes in weather conditions, chaotic ride vehicles, cutting crowfoot, forage grasses, shrubs, destruction of adolescents , unsystematic grazing, poaching) is also recorded. A weak degree of anthropogenic load in this region should be also noted.

Pic.4. Anabasis salsa plants at the gray-brown desert soils



Pic.5. Anabasis salsa plants at the takyr soils

Depending on landscape plants (boyalysh, Artemisia, Anabasis salsa and Haloxylon) the following animal species are recorded: eared hedgehog *Hemiechinus auritus*, tolai hare *Lepus tolai*, yellow ground squirrel *Spermophilus fulvus*, Severtsov jerboa *Allactaga severtzovi*, small jerboa *Allactaga* elater, lesser five-toed jerboa Alactagulus pumilio, house mouse Mus musculus, gerbils (tamarisk Meriones *tamariscinus*, noon *Meriones meridianes*, red-*Meriones libycus*, the great gerbil *Rhombomys opimus*), Common mole vole *Elljdius tancrei*, among varmints the wolf *Canis lupus*, fox *Vulpes vulpes*, wild or spotted cat *Felis libyca,* among hoofed - gazelle *Gazella subgutturosa*, saiga *Saiga tatarica*.

During the years of observation in the vicinity of the central part of Karakalpakstan Ustyurt in different seasons (2001-2005 gg.) the average number of wild animals recorded at or 1 square km was: Fox-0,5; corsac-0,03; wolf-0,01; rodents: gerbils 6,0; jerboa-8.0.

In this region we have recorded 74 species, of which 9 species are included in the Red Data Book of Uzbekistan (2006) – snake eagle *Circaetus gallicus*, steppe eagle *Aquila rapax*, imperial eagle *Aquila heliaca*, golden eagle *Aquila chrysaetos*, Saker Falcon *Falco cherrug*, Lesser Kestrel *Falco naumanni*, jack or bustard -Gorgeous *Chlamydotis undulata*, little bustard *Tetrax tetrax* and pintail *Pterocles alchata*.

According to our observation during the winter flights the main group of birds is concentrated in Haloxylon, steep downturn and the surrounding settlements. In the vicinity of settlements (Kyrkkyz settlement) during the year there are sedentary species that include: Common Kestrel *Falco tinnunculus*, rock pigeon *Columba livia*, a small turtle-dove *Streptopelia senegalensis*, Collared Dove *Streptopelia decaocto*, Little Owl *Athene noctua*, mynah *Acridotheres tristis*, jackdaw *Corvus monedula*, black Crow *Corvus corone*, Rook *Corvus frugilegus*, tree sparrow *Passer montanus*, etc.

Sedentary species of birds recorded on the plateau and the steep downturn: a golden eagle *Aquila chrysaetos*, bolaban *Falco cherru*g, Keklico *Alectoris chukar*, owl *Bubo bubo*, Little Owl *Athene noctua*, crested lark *Galerida cristota*, Grey Shrike *Lanius excubitor*, skototserka *Scotocerca inquieta*.

Within the Akchalak territory during the winter period the following wintering birds are observed - rough-legged hawk Buteo lagopus, Buzzard Buteo rufinus, imperial eagle Aquila heliaca, steppe eagle Aquila rapax, merlin Falco columvarius, gray lark Calandrella rufescens, Field Lark Alauda arvensis, skylark black Melanocorypha yeltoniensis, white wagtail Motacilla alba, Common Starling Sturnus vulgaris, gray crow Corvus cornix, Waxwing Bombycilla garrulus, Black-throated Thrush Turdus atrogularis, Redbreast Erithacus rubecula, chaffinch Fringilla coelebs, bramble finch Fringilla montifringilla, siskin Spinus spinus, ordinary grosbeak Coccothraustes coccothranstes.

From the beginning of March until the end of May, from late August to early November there is spring and autumn migration - arrival and the flight of birds the following species: Field harrier Circus cyaneus, jack or bustard Chlamydotis undulata, little bustard Tetrax tetrax, Caspian Plover Charadrius asiaticus, black-bellied sandgrouse Pterocles orientalis, pintail Pterocles alchata, Sandgrouse Syrrhaptes paradoxus, roller Coracias garrulus, little green bee-eater Merops superciliosus, Swifts Apus apus, little lark Colonderella cinerea, steppe larks Melanocorypha calandra, eastern calandra lark Melanocorypha bimaculata, yellow wagtail Motacolla flava, brown willow warbler Phylloscopys collybita, southern warbler Hippolais rama, desert chat Oenanthe deserti, isabelline wheatear Oenanthe isaballina, stove-Pied Wheatear Oenanthe pleschanka, blue-throated warbler Luscinia svecica, Indian Sparrow Passer indicus, red-headed bunting Bunting Emberiza bruniceps etc.

Akchalak territory is characterized by typical nesting species - Steppe eagle Aquila rapax, Buzzard Buteo rufinus, imperial eagle Aquila heliaca, Common Kestrel Falco tinnunculus, Keklico Alectoris chukar, Caspian Plover Charadrius asiaticus, black-bellied sandgrouse Pterocles orientalis, white-bellied sandgrouse Pterocles alchata, owl Bubo bubo, Little Owl Athene noctua, roller Coracias garrulus, little green bee-eater Merops superciliosus, crested lark Galerida cristota, shore Lark Calandrella cheleensis, eastern calandra lark Melanocorypha bimaculata, Grey Shrike Lanius excubitor, isabelline wheatear Oenanthe isaballina, stove-Pied Wheatear Oenanthe pleschanka, Indian Sparrow Passer indicus, etc.

Sudochye lake system is characterized by a unique place for flight congestion and hydrophilic nesting avifauna with specific importance in the current environmental situation for the conservation of biological diversity of wetland ecosystems, not only the study area, but also in other Central Asian states.

From 1991 up to present times there is an operating Ornithological Reserve, established under the Convention between the former USSR and India, "On the protection of migratory birds and their habitats."

Ornithological Reserve is located in the Muynak district, an area of 50,000 hectares. The northern boundary extends from the escarpment Urga (Ustyurt) to the east to the West Karateren. The eastern boundary runs along the eastern shore of the Sudochye lake. The southern border - on the southern shore of the Sudochye lake and western border - on cliff of Ustyrt Plato to the Urga cape.

Sudochye lake - is a natural reservoir, consisting of a large number of small and four large basins (Akushpa, Karateren, Begdulla-Aydin and large Sudochye):
- Karateren Lake skirts Cape Urga of Ustyurt Plato
- Big Sudochye Lake is located in south-eastern part of wetlands
- Begdulla-Aydin is Lake is located in the central part of the wetlands
- Akushpa is located in the western part of the wetlands

Hydrology - according to satellite images (July 2000) the Sudochye Wetland covers an area of 34,280 hectares and has an outer perimeter of 112.1 km. Akushpa Lake occupies 4,527 hectares, the Great Sudochye - 2,267 hectares, Karateren 361.9 hectares Begdulla-Aydin 601.1 ha, Tiles - 527.2 ha. Shallow lakes have diameters ranging from tens to hundreds of meters

Soil type - river sediment, marsh - meadow, meadow-takyr medium - pickled, takyr - salted, takyr - weakly – saline.

Water quality – is a naturally permanent saline / brackish / slightly alkaline lake. In most areas of mineralization of desalinated flow corresponds to mineralization supply drains - 3-4 grams per liter. In 2008, the water flows through the collector of the KKC in a small amount, the flow is very low, the salinity of about 6 g / l and the terminal portion of the West Karateren lake is 14.3 grams per liter.

The depth and permanence of water: An analysis of the current state of wetlands Sudochye (2008) showed that even in dry years the lakes West Karateren and Akushpa are not shallow; the water level remained at the same level.

Climate: sharply continental with long and dry summers, cold winters with little snow and northerly winds. Average annual air temperature 10-11,90 C, maximum temperature 43.90 C, minimum - 26.70 C. Average annual rainfall - 85,5-117,2, on average - 100.7 mm.

Hydrological values: Wetland Sudochye fed by drainage and waste water from the left bank of the Amu Darya River. In some wet years, the flood waters from the Raushan duct contributed to desalination of lake systems which water nutrition is carried out through the drain of collector and a small surplus of water irrigation that support the stability of the coastal line of the lake.

In order to eliminate the dead zones and improve water circulation in Wetland a system of environmental channels contributing the sharing of river water in the area was created. As a result of the engineering activities by autumn 2002, the mineralization of water in wetlands was on the level of 0.95 - 6.35 g/liter. The water flooded area has exceeded over 20 hectares of wetlands, the water depth increased to 3,0-3,5 m. However, in 2008, the lake has dried up and salinized: the water salinity rises everywhere, especially in inland areas. In most water flooded areas the mineralization of the supply drains reached 3-4 grams per liter.

As for the following Projects: GEF "Ecological monitoring of Sudochye wetlands" and "Restoration of ecosystem at Sudochye lake" (1999-2002) there was conducted special monitoring researches at Sudochye wetland in relation to the abundance of plants and animals.

In 2008, within the international program IBA «Important Bird Areas» or "Important Ornithological Area" (IOA) (2005-2006) the Sudochye wetland was included to the international database of BirdLife - Wold Biodiversity Date Base (code Uz002);

In 2007based on the United Nations Development Program in Uzbekistan (UNDP) the special cadastral survey on “The collection, processing information and creating an electronic database of the State inventory of the current state of flora and fauna, as well as water bodies in protected areas of the Republic of Karakalpakstan” was conducted.

In 2008 the «Wetlands International» Program on “Autumn biodiversity and abundance of avifauna of wetlands of the Southern Aral Sea” has confirmed the value of Sudochye wetlands for biodiversity conservation not only of hydrophilic complexes and globally threatened species of birds and fish, but also some mammals and reptiles.

Pic.6. Sudochye wetland with the wetland vegetation

In the waters of Sudochye wetland the following wetland vegetation (hydrophytes and hydrophyte) is forming: as such hydatophyte (bottom vegetation) *Chara dominii, Chara contraria и Chara fischeri, Potamogeton pusillus*, *Potamogeton pusillus, Potamogeton pectinatus*, *Ruppia martima,Najas marina, Ceratophyllum demersum* - are typical wetland plants; hydrophytes (semi-aquatic vegetation) *Phragmithes australis, Typha angustifolia and Tripolium vulgare* are the most common and numerous representatives of the hydrophilic flora water of Sudochye wetlands.

Streamside vegetation of Sudochye wetlands is represented by 71 species of higher plants and formed by three ecological types of vegetation: mesophytes, xerophytic and halophytes. The main dominants mezphyt vegetation type is: *Phragmites australis, Typha angustifolia, Bolboschoenus maritimus, Scirpus litoralis.*

Among xerophytes dominate: *Tamarix laxa, Tamarix ramosissimma, Halimodendron halodendron, Haloxylon aphyllum, Alhagi pseudalhagi*.

The main representatives of halophytes are: *Halostachys belongeriana, Salsola dendroides, Kalidium kaspicum, Tamarix hispida, Salicornia europea.*

Pic.7, 8. Western part of Plato Ustyurt cliff

The whole territory of wetlands - shore, the coastal zone and water area is the habitat of animals.

Community of animals is represented by mainly species whose life is connected with water: among them fish, water birds and mammals.

On the territory of Sudochye wetlands there live 22 species of mammals: among them *Insectivor a* - insectivores - 2 species, *Lagomorpha* - Lagomorphs - 1 species, *Rodentia* - rodents - 11 species, *Carnivora* - carnivores - 6 species, *Artiodactyla*-artiodactyls - 3 species, *Amphibia* - Amphibians 1 species and other *Reptilia* – reptiles.

The western part of the wetlands is represented by plant communities of the reed, soleros, tamarisk - grassland with sarzasan and saltwort – tamarisk association with the following inhabitants: the hare *Lepus tolai*, muskrat *Ondatra zibethicus*, jackal *Canis aureus*, wild boar *Sus scrofa*, many species of rodents - *Rodentia, Chiroptera* - *Chiroptera*, reptiles - *Reptilia* and Amphibians – *Amphibia.*

The pre-cliff group of motley saxaul and sagebrush associations typical for Ustyurt is a habitat for an animal population that includes: hare *Lepus tolai*, wolf *Canis lupus*, jackal *Canis aureus*, fox *Vulpes vulpes*, gazelle *Gazella subgutturosa*, saiga *Saiga tatarica*, and for many species rodents - *Rodentia*, bats - *Chiroptera* and reptiles - *Reptilia*.

The east coast of wetlands has mosaic vegetational cover and represented by tamarisk-karabak, kargan, azhrek and dzhantach associations. The fauna is represented by: hare *Lepus tolai*, muskrat *Ondatra zibethicus*, wolf *Canis lupus*,, jackal *Canis aureus*, fox *Vulpes vulpes*, reed cat *Felis chaus*, wild boar *Sus scrofa*, many kinds of rodents - *Rodentia*, reptiles - *Reptilia* and Amphibians - *Amphibia*

Being in the heart of the migration path of waterbirds, the Sudochye wetland plays a specific important role as a resting place of the birds during their seasonal migration and breeding. Currently the wetland territory is characterized by the high concentration of birds during the migration, since the lakeside is an important feeding areas for many wetland birds, especially wading, Anseriformes and Charadriiformes.

At the Sudochye lake it was recorder about 192 types of birds, among which the following types are included to the International Red Data Book of IUCN and the Red Book of the Republic of Uzbekistan:

Dalmatian Pelican *Pelecanus crispus*, White Pelican *Pelecanus onocrotalus*, little cormorant *Phalacrocorax pugmaeus*, Little Egret *Egretta garzetta*, ibis *Plegadis falcinellus*, Common flamingo *Phoenicopterus roseus*, whooper swan *Cygnus cugnus*, mute swan *Cygnus olor*, Red-breasted Goose *Rufibrenta ruficollis*, Lesser White-fronted *Anser erythropus*, Marbled Teal *Anas angustirostris*, black eyed *Aythya nyroca*, headed Duck *Oxiura leucocephala*, Pallid Harrier *Circus macrourus*, golden eagle *Aquila heliaca* , White-tailed Eagle *Haliaeetus albicilla*, Pallas' sea eagle *Haliaeetus leucoryphus*, Saker Falcon *Falco cherrug*, kestrel-steppe *Falco naumanni*, bustard or jack *Chlamydotis undulate*, Black-headed Gull *Larus ichthyaetus*, pintail *Pterocles alchata.*

The greatest number of bird species we observed during migration in spring and autumn. Spring migration begins in late February and ends in mid-May, Autumn - August to November.

Among them the most massive pelicans were: *Pelecanus onocrotalus*, *Pelecanus crispus*, Great Cormorant *Phalacrocorax carbo*, common heron *Ardea cinerea*, coot *Fulica atra*, grey lag goose *Anser anser*, Red-crested *Pochard Netta rufina*, red-duck *Aythya ferina*, mallard Anas platyrhynchos, shoveler *Anas clypeata*, gray duck *Anas strepera*, garret *Bucephala clangula*, Merganser *Mergus merganser*, black-headed gull *Larus ridibundus*, etc

Few types of migrants - a small cormorant *Phalacrocorax pygmaeus*, ibis *Plegadis falcinellus*, great white egret *Egretta alba*, common flamingo Phoenicopterus roseus, eyed Duck Aythya nyroca, headed Duck *Oxyura leucocephala*, teals *Anas crecca*, smew Mergellus albellus, demoiselle *Antropoides virgo*, lapwing *Vanehlus vanellus*, avocet *Recurvirostra avosetta*, Whimbrel *Numenius phaeopus*, Black-headed Gull *Larus ichthyaetus*, black-headed gull *Larus ridibundus*, sea dove *Larus genei*, chegrava *Hydroprogne caspia*, etc.

The following main wintering species live in nearby areas of Sudochye Lake adjacent to the Ustyurt Plato: predatory - rough-legged hawk *Buteo lagopus*, Buzzard *Buteo rufinus*, eagle - *Aquila heliaca*, white-tailed eagle *Haliaeetus albicilla*; sparrow - black lark *Melanocorypha yeltoniensis*, horned lark *Eremophila alpestris*, white wagtail *Motacilla alba*, Common Starling *Sturnus vulgaris*, gray crow *Corvus cornix*, Fieldfare *Turdus pilaris*, mistle thrush *Turdus viscivorus*, blackbird *Turdus merula*, long-tailed tit *Aegithalos caudatus*, chaffinch *Fringilla coelebs*, юрок *Fringilla montifringilla*, siskin *Spinus spinus*, ordinary grosbeak *Coccothraustes coccothranstes*, reed bunting *Emberiza schoeniclus* etc.

However, in the warm winter periods the following Wetland Birds are common: Grey heron Ardea cinerea, whooper swan Cygnus cugnus, mallard *Anas platyrhynchos*, common-teal *Anas crecca*, Red-crested *Pochard Netta rufina*, red-duck *Aythya ferina*, Shoveler *Anas clypeata*, goldeneye *Bucephala clangula*, big breasted Merganser *Mergus merganser*, black-headed gull *Larus ridibundus*.

Settlement of sedentary birds in conjunction with the landscape and habitat area of Sudochye wetlands include: Common Kestrel *Falco tinnunculus*, Falco *Falco cherrug*, Khiva Pheasant *Phasianus colchicus*, eagle owl *Bubo bubo*, Little Owl *Athene noctua*, long-eared owl *Asio otus*, crested lark *Galerida cristata*, mynah *Acridotheres tristis*, Jackdaw *Corvus monedula*, rook *Corvus frugilegus*, black crow *Corvus corone*, Scotocerca *Scotocerca inquieta*, tugai nightingale *Erythropygia galactotes*, tit *Panurus biarmicus*, Bukhara tit *Parus bokharensis*, tree sparrow *Passer montanus*.

Wetlands territory is available for settlement by migratory-nesting speciesof birds such as - large or grebe grebes *Podiceps cristatus*, Quaqua *Nycticorax nycticorax*, mute swan *Cygnus olor*, Red-crested *Pochard Netta rufina*, Ruddy Shelduck *Tadorna ferruginea*, shelduck *Tadorna tadorna*, mallard *Anas platyrhynchos*, gadwall *Anas strepera*, black eyed *Aythya nyroca*, headed Duck *Oxiura leucocephala*, marsh harrier *Circus*

aeruginosus, water hen *Gallinula chloropus*, coot *Fulica atra*, sea plover *Charadrius alexandrinus*, a small plover *Charadrius dubius*, oystercatcher *Haematopus ostralegus*, lapwing tailed *Vanellochettusia leucura*, stilt *Himantopus himantopus*, meadow tirkushka *Glareola pratincola*, Gull Gull *Larus argentatus*, Common Tern *Sterna hirundo*, little tern *Sterna albifrons*, etc.

The saiga antelope Saiga tatarica - Disappearing rare species. In 2008, these species has received an "endangered" status.

At the Ustyurt region such species are widely spread in the following territories: Tchuruk, Baiterek, Beleuli, Terenkuduk, Alan, Karakalpakstan. Mainly it was found in the clay plains, gravelly deserts and semi-deserts, and sometimes (in winter) in the sandy desert.

Saiga – is a polygamy and has a gregarious lifestyle. Fertility composes 1-2 cubs. In the autumn - winter period it forms a network of trails in all plant communities, lives in Anabasis salsa, boyalish and wormwood and black saxaul formations. Saiga eats plants such as rhubarb, ephemeral, ephemeroids, Anabasis salsa, tarragon etc.

Currently Ustyurt saiga population is facing extinction. On the point of 100 km2 the population composed only 3 individuals.

It should be noted that only in the northeastern part of Ustyurt it is operates the State nature reserve "Saiga", formed by the decree of the Council of Ministers of the Republic of Karakalpakstan № 311/42 dated 29.11.1991.

In 2008, in the northern part of the Plateau there are not favorable climatic factors such as: severe winter, thick snow cover stayed almost until mid-February, which caused difficulties in the saiga antelope in production of fodder. The influence of these factors led to the migration of saiga population outside the reserve, ie, the saiga migrations from northern to central plateau and to the territory drained bottom - Surgil.

In October 2009, in the central part of the Plateau within 3 days the precipitation (rain) were observed, with resumed phenological stages of development (growth, flowering) in ephemera and ephemeroids. Ephemerals completed the growing season in the summer and remain depressed once again come in the phenological phase of development. The following plants (celnolistnik, wormwood, Anabasis salsa, boyalish) are also entering a phase of flowering, the general background gets the green aspect of an ecosystem. Therefore, in this period we have seen movement and resettlement of Kazakhstan saiga population in the central part of the plateau with more favorable feeding conditions. However, due to sudden frosts (-2, -3 0 C) the above plants are not the phase of fruiting, growth and development stops there dying plants. The result is a reverse migration of the saiga of central part of the plateau to the north. Thus, antelopes migrate to habitats only after the onset of certain factors.

This project site has no negative factors of anxiety, the negative impact on the migratory route of saiga antelope.

While implementing the "Construction of Ustyrt GCC on Surgil field with field development" certainly there are problems with biodiversity conservation at project area, in particular the problems of the avifauna and saiga.

The main factors affecting the stability number of birds should be considered as the degree of development of the project area, i.e the need to create an eco "corridor" for migrants (birds and antelopes).

Anthropogenic disturbance of natural ecosystems of Surgil field causes scarcity of biodiversity area. This water area does not provide the necessary living space, is not significant for birds in the nesting period. Many birds in this region deviate from the original migration route, due to factors - lack of food in the area which leads to the weak migration of birds.

As is well known the connection of birds to the place of birds nesting territory due to the optimal conditions for the existence of this area, in particular Ustyurt (Akchalak). However, in the event of a signal warning on danger, the birds migration in the directions to other parts of the plateau, where the birds nesting habitat suit.

During the migration of birds prefer to fly at different height. Analysis of data on the height of flight of different groups of birds shows a maximum height of birds up to 2000 and even 3000 m. It was found that spring migrations occur at higher altitudes than in autumn, the birds fly at night at higher height than during the day. Passerine birds fly at altitudes of 1500 m, larger - 2000-2500 m. Waders are flying at the height of about 1500 m. Therefore, at the height of bird migration project area does not create barriers.

Analysis of birds migration shows that the bigger part of Sudochye wetland birds fly to the northeast and the smaller part to the west. In April, most birds fly to the north-east, in May fly to the east and west due to the feed migration to the Muynak and Sarybas gulfs and further to Siberia.

The results of the analysis on the status of species composition, conservation status, districts, and the nature of the host bird avifauna at the project area are given in Annex 1.

We have proposed the following results of comprehensive studies of bird migration of project area, but the queries relating to the "Construction of Ustyrt GCC on Surgile field with field development" Project requires the preservation of biodiversity at this territory. In this regard, we offer the following security measures:

sustainable use of biodiversity resources;

use of bioacoustic method, namely the scaring birds with screams of fear, recorded on tape M-30 (Reporter 2), RK-Yu; noise means, vinyl balls - scary eyes, etc.

landscaping the territory of Surgil field (dried bottom of Aral Sea), Akchalak settlement (Ustyrt Plato) with sowing seeds, planting seedlings, seedlings of desert wild, woody shrub species.

Research Associate: G.A. Matekova

R.K. Pirjanova

Appendix I. Ecology – Texnet Report

REPORT ON THE STUDY OF FLORA AND FAUNA OF SURGIL, NORTH AND EAST BERDAKH, UGCC DEPOSITS AND RELATED INFRASTRUCTURE

CONTENTS

INTRODUCTION

Currently, the project "Surgil" has been launched which includes the development of gas fields and the construction of Ustyurt Gas and Chemical Complex (UGCC) for the production of petrochemical products. Construction and operation of the Project facilities may have a number of positive and negative environmental impacts. Therefore, in environmental and socio-economic impact assessment (ESEIA) on the project "Surgil" assessment of impacts on biodiversity components of the project area is carried out. The purpose of assessment is to examine and minimize the negative impacts in the process of project implementation on flora and fauna in general, including, on endemic and rare species of plants and animals and their habitats.

The project provides for the development of three components:

- Gas well drilling and construction of relevant communications in the fields Surgil, Northern and Eastern Berdakh to the south of the current Aral Sea;
- Construction and operation of Ustyurt Gas and Chemical Complex (UGCC) near the village Kyrkkyz/Akcholak on the Ustyurt plateau, and related infrastructure;
- Construction and operation of underground pipelines to transport gas and condensate from fields to the the gas and chemical complex.

The present study is aimed at preparing the review of the current state of flora and fauna and their habitat in the project and adjacent area; collecting information on the habitats of protected species of plants and animals (mammals, birds, reptiles), and existing environmental restrictions on the territory of the Contract area, including specially protected natural areas (nature reserves, sanctuaries, etc.).

To solve the problems set by a group of scientists from the Institute of Biology of Karakalpakstan Branch of the Academy of Sciences of Uzbekistan, the Institute of Zoology of Uzbekistan Academy of Sciences and the SPE "Botanica" of the Academy of Sciences of the Republic of Uzbekistan in the contract area a review of basic information on the biodiversity of the project area, and summer field studies were conducted, as a result of which information was received on the species composition of plants and animals, including endangered, rare and valuable species inhabiting in the Contract area during the study period, the number and spatial distribution of background species of plants and animals; places of concentration; the state of habitats; threat factors.

1. REVIEW OF BASE MATERIALS ON THE BIODIVERSITY OF CONTRACT AND ADJACENT TERRITORIES

1.1 Vegetation

Karakalpak part of Ustyurt occupies more than 7,2 million hectares and represents a vast biome perspective for livestock development. Ustyurt in general, is an elevated plateau, occupying the northern part of the Aral-Caspian watershed. The plateau is limited by cliffs in almost all sides. In the east the cliff of Ustyurt is formed by former western shore of the Aral Sea. In the south it is cut off to Kunya-Darya ancient alluvial plain and the valley Uzboy. In the west - to the hollow Karynyaryk and the sands of the North-Caspian Kara Kums, and in the north - to the Caspian lowland.

Speaking about the main features of Ustyurt flora, one can distinguish flora of gypsophytes in the narrow sense of the word and flora of gypsum deserts. The first group should include plants, water and mineral nutrition of which is closely related to the gypsiferous horizons of soils. The second group includes species growing in gypsum deserts and not directly binded by gypsiferous horizons of the soil.

Flora. According to E.P. Korovin and I.I. Granitov (1949), flora of Karakalpak part of Ustyurt is estimated by 165 species of flowering plants collected by the expedition SaGU in 1944-1945. on the plateau and cliffs. Of these, 45 species, or 27% belong to the family Chenopodiaceae. Since this list was compiled based on summer and autumn collections, ephemeras and many ephemeroides were not included in this list. Later collections of Ustyurt flora were replenished by collections of K. Koybagarov (1972), according to which, the overall number of species of Karakalpak part of Ustyurt is 402. The author covers a wider area, including habrs in the northern part of the plateau (Sam, Mataykum). If to exclude 402 species from the list, given in an unpublished summary of K. Kaybagarov, the species collected at salt marshes and sands, then the number of species natural for plateaus and cliffs, will be 330. And in this case family Chenopodiaceae includes 19,7% of species. In studying the flora of the eastern cliff B.Sarybaev (1981) indicates 302 species. Later B. Sarybaev, Sh. Saparov (1977) for the north-western Ustyurt indicates 406 species. The most reliable data on the flora of Karakalpak Ustyurt is the paper of A. Allaniyazov, B. Sarybaev (1983). In this work for this region the authors present 406 species of plants belonging to 208 genera belonging to 46 families. According A. Allaniyazov (1995), in Ustyurt as per species diversity the first place is taken by the family *Chenopodiaceae* (91), the second - by *Asteraceae* (48), the third – by *Brassicaceae* (43), the fourth – by *Poaceae* (27) and fifth - by *Fabaceae* (24). The vegetation cover of Ustyurt the gravity is occupid by perennial herbs, followed by: annual plants, subshrubs, semifrutex, biennial plants, trees and shrubs.

Despite that the species composition of Karakalpak Ustyurt has not yet been studied fully. An example is a new species of the genus *Allium L.* found by us during the expedition on the Ustyurt plateau in May of this year (photo 1). The species has not yet been described, but, according to experts close relatives of this species occur in the flora of Turkey.

Among endemic of the gypsum desert *Salsola chivensis* and *Sisymbrium subspinenscens* can be indicated, occurring in Ustyurt. Both species on Ustiurt grow on strongly gypsiferous soils (Momotov, 1973).

Vegetation. Vegetation cover major regions of the gypsum desert sharply differs primarily on the composition of edificators. On Ustyurt according to Momotov I.F. (1973), it is composed of a few species, forming monodominant communities, ther are *Salsola arbusculiformis, Anabasis salsa, Artemisia terrae-alba, Haloxylon aphyllum, Salsola orientalis*. Less frequently dominants and subdominants of plant communities are *Salsola arbuscula, Atraphaxis spinosa, Stipa richteriana, S. hohenackeriana, S. Gemmascens, Nanophyton erinaceum*.

Photo. 1. Allium kamelinii F.O.Khass. et Shomuradov ined. (Ustyurt, 2010)

In the south of Ustyurt large areas are occupied by monotonous vegetation cover of Anabasis salsa association, which creates a monotone gray background for many kilometers. Microcomplexity combination of associations of Anabasis, wormwood, Salsola arbuscula and some other plants in the central and northern parts of Ustyurt attach features to the original vegetation cover, recurring nowhere more than in Uzbekistan. In years with favorable climatic conditions, with good regrowth of plants, vegetation of Ustyurt forms a beautiful carpet of natural vegetation associations combined.

The relative poverty of vegetation cover of Ustyurt with herbaceous plants, in particular, ephemeras, is reflected in the limitations of the contents of associations. The cover is often formed by one species with even distribution of plants in the entire area of the association. The associations of anabasis, wormwood, haloxylon often appear this way. Only *Rheum tataricum, Atraphaxis spinosa* and *Stipa richteriana* (photo 2) are clearly visible against the background of wormwood and Salsola arbuscula.

Photo 2. Rheum tataricum against the background of Egnatioides (Ustyurt, 2010)

Vegetation cover of Ustyurt, as well as of other gypsum deserts, its structure and dynamics are closely related to environmental conditions. According to E.P. Korovin (1949) after drying Sarmatian strata in the Miocene Ustyurt was located in the area of arid climate. The settlement of its territory with vegetation occurred "due to coastal marine flora". Vegetable landscapes on Ustyurt have been formed by plants of primary hammada and variegated flora (Popov, 1923), fragments of which have survived in the modern vegetation cover of plateau in the form of rare species. Thereto E.P. Korovin (1949) relates the following: *Salsola chivensis, Sisymbrium subspinescens, Cleome noeana, Seseli tenuifolium, S. cuneifolium, Zigophyllum macropterum, Z.brachypterum, Z. eichvaldii, Z.turcomanicum.*

Main formations and associations of Ustyurt. Convolvulaceae formation. I.I. Granitov (1967) considers bindweed a relict plant. On Ustyurt one association is known, where dominates *Convolvulus fruticosus* - sagebrush-atrofaksis convolvulaceae on gray-brown gypsum-bearing soil. The plot of this association is described close to Baychagyr village. In the list of plants of associations E.P. Korovin and I. Granitov (1949) note *Convolvulus fruticosus, Atraphaxis spinosa, Artemisia terrae-alba, Anabasis salsa, and Stipa sp.*

In the content of formation of Salsola arbusculiformus formation I.I. Momotov (1973) distinguishes two associations: Salsola arbusculiformus and Artemisia Salsola arbusculiformus. The first association is natural only for the Ustyurt and the second is described in the Kyzyl Kum. The floristic composition of Salsola arbusculiformus association is poor. In addition to *Salsola arbusculiformus* the following can be met: *Atraphaxis spinosa, Convolvulus fruticosus, Artemisia terrae-alba, Asparagus bresleriana, Stipa richteriana, Astragalus erioceras, Scorzonera pusilla, Rheum tataricum, etc.* According to the author Artemisia Salsola arbusculiformus association on the gray-brown soils of Ustyurt can be considered as transitional between Salsola arbuscula and wormwood. Floristic composition is poor here as well and consists of only 7 species. In addition to wormwood and Salsola arbuscula, the following marked: *Stipa hohenackeriana, Anabasis salsa, Convolvulus fruticosus, Eremopyrum buonapartis, Ceratocarpus utriculosus.*

On the gray-brown soil of Ustyurt in the content of Artemisia terrae–albae formation E.P. Korovin and I. Granitov (1949) distinguish Artemisia terrae–albae association. The floristic composition of this association is not rich. In addition to wormwood, Salsola rigida and Anabasis salsa, in the described area the following were marked: *Stipa szowitsiana, Ceratocarpus utriculosus, Eremopyrum distans, Diptychocarpus strictus.* Later Momotov I.F. (1953) in the

same formation provides another 2 associations: Atraphaxis L.-Stipa- Artemisia terrae–albae (species composition consists of 7 species) and H. aphyllum-Rhubarb- Artemisia terrae–albae. The latter association is described in the district of Kosbulak village in flat degradation. Botanical composition here is fairly rich and consists of 36 species of flowering plants. The specific of the floristic composition is emphasized by the relatively low percentage of annual plants, which is typical for communities of Ustyurt.

Anabasis salsa should be particularly noted, occupying the territory of Karakalpakstan Uatyurt of about 3,5 million hectares. E.P. Korovin and I. Granitov (1949) note that the areas of pure Anabasis salsa occupies several thousands of hectares in the south of Karakalpakstan Ustyurt in the margin adjacent to Sarykamysh, as well as to the north-east of Barsakelmes. On these arrays Anabasis salsa makes up 90-95% and 40-60% in the north. Within the same formation Momotov I.F. (1973) noted the following associations: anabasis salsa, Lichenes-Anabasis salsa, Algae-Anabasis salsa, Nanophyton erina-ceum-Anabasis salsa, Salsola Gemaceus/Anobasis Salsa, Salsola arbuscula-Anabasis salsa, Salsola rigida-Salsola arbuscula-Anabasis salsa, Artemisia-Anabasis salsa, Limonium - Artemisia -Anabasis salsa.

The most complete information about the plant communities of Ustyurt can be found in the work of A. Allaniyazov (1995). The author within Karakalpakstan Uatyurt separated 70 associations belonging to 19 formations, 9 cenotypes and 5 edaphotypes (Table 1).

Table 1. Schedule of classification of Ustyurt vegetation (according to A. Allaniyazov, 1995.)

Edaphotype	Cenotype	formation	Association
Psammophyta	*Psammodendra*	*Haloxyleta persici*	Caryx thydes-Aristida pennata - H. persicum; ephemeras -Salsola arbuscula-H. persicum; Caryx thydes - Artemisia - H. persicum
		Ammodendrata conollyi	
		Mixto calligoneta	Aristida pennata – Ammodendron cololyi; H. persicum -Calligonum-Ammodendron cololyi
		Salsoleta arbusculae	
Gypsophyta	*Gypsothamna*	*Salsoleta arbusculiformis*	Calligonum - Caryx thydes
		Anabasieta salsae	Salsola arbuscula; Artemisia - Salsola arbuscula; Salsola rigida - Salsola arbuscula; Anabasis salsa - Salsola arbuscula
	Gypsohemi-thamnisca	*Nanaphyteta erinacei*	
		Artemisieta terrae-	Salsola arbusculiformus;

Edaphotype	Cenotype	formation	Association
		albae	Artemisia - Salsola arbusculiformus; Anabasis salsa - Salsola arbusculiformus; Stipa - Salsola arbusculiformus
		Anabasetae turcestanicae	
		Salsoleta orientale	Anabasis salsa; Haloxylon - Anabasis salsa; Artemisia - Salsola rigida - Anabasis salsa; Salsola arbuscula- Anabasis salsa; Pea shrub - Anabasis salsa; Nanophyton erinaceum - Anabasis salsa
		Haloxyleta aphylly	
		Halocnemeta Strobilacei	
Halophyta	*Halodendra*	*Kalidieta caspici*	Nanophyton erinaceum
	Halothamna	*Limonieta otolepisi*	Artemisia; Salsola arbuscula- Artemisia; Herb- Artemisia; Haloxylon - Salsola rigida - Artemisia; Salsola rigida - Artemisia; Anabasis salsa - Artemisia
		Tamariceta	
		Cariceta Physoides	
	Halohemi-thamna		
		Poeta bulbosae	Echiochloa; Anabasis salsa - Echiochloa; Haloxylon – Echiochloa and etc.
	Ephemeroideta	*Rheumeta tatarici*	
Potamophyta			
			Salsola rigida; Artemisia - Salsola rigida; Caryx thydes - Salsola rigida; Haloxylon Salsola rigida; Salsola arbuscula- Salsola rigida and etc.
Ephemeropoia		*Eremopyrae orientale*	
	Ephemereta		

Edaphotype	Cenotype	formation	Association
			Artemisia -H. aphyllum; Poa pratensis - H. aphyllum; Herb- H. aphyllum H. aphyllum - Halocnemum strobilaceum; Kalidium- Halocnemum strobilaceum; Limonium - Halocnemum strobilaceum Saltwort; Halocnemum strobilaceum - Kalidium; Tamarix liistida- Kalidium; Herb- Kalidium Kalidium; Alekopis litoralis- Kalidium; Halocnemum strobilaceum- Kalidium; Nanophyton erina-ceum - Kalidium Tamarix liistida; H. aphyllum- Tamarix liistida H. aphyllum- Caryx thydes; Salsola rigida - Caryx thydes; Calligonum- Caryx thydes; Herb- Caryx thydes Artemisia - Poa pratensis; Salsola rigida - Poa pratensis; H. aphyllum - Poa pratensis

Edaphotype	Cenotype	formation	Association
			Artemisia - Anabasis salsa - Rhubarb; Herb- Anabasis salsa - Rhubarb; Salsola arbuscula- Ephemer - Rhubarb and etc. Poa pratensis - Arpahan; Herb- Arpahan; H. persicum- Arpahan

Vegetation of the contract area of Ustyurt.

Taily. According to unpublished data (map of vegetation of Ustyurt compiled by U. Allanzarova, 1988) in Taily area Artemisia terrae–albae -Anabasis salsa complexes on brownish gray loamy, alkali-saline soils have been registered. As part of this complex Salsola rigida-Anabasis salsa association is highlighted, sometimes with the participation of *Nonophyton erenaceum* and *Artemisia terrae-alba* on the alkali-saline soils.

Akushpa. On brownish gray loamy, alkali-saline soils, as well as in the filed Taily, Artemisia terrae–albae -Anabasis salsa complexes are distributed. In wet salt marshes a number of Reed- Tamarix - Alekopis litoralis - Tamarix halophytic communities are identified. As a part of this series a reed association with the participation of tamarisk *Tamarix elongate, T. laxa* is highlighted.

On the territory of UGCC on loamy alkali-saline soils U. Allanazarovs marked Anabasis salsa-white landed Artemisia and Kalidiumassociation, sometimes with sarsazan *Halimocnemum sp.,* comprising Anabasis salsa- white landed Artemisia complex.

Flora and vegetation of the dry bottom of the Aral Sea. To date, scientific literature does not have sufficient information on the flora and vegetation cover of the dried part of the Aral Sea. According to recent data (Sherembetov, 2009) flora of the south-western part (the Uzbek part) of the dried Aral Sea bed has 135 flowering plant species belonging to 72 genera and 26 families, dominated by family Chenopodiaceae, typical for all the deserts of the Central Asia.

Study of the formation of landscapes, the trend of development of individual components of natural territorial complexes and mapping of plant communities of an exposed portion of the Aral Sea bed was carried out by some scholars (Ashurmetov and others, 1998; Kurbanniyazov, 2000; Rafikov, 1998; Matzhanova and others, 2006, Kuzmin and others, 2006). There is a map of vegetation in different parts of the dried bottom of the sea (Ashurmetov and others, 1998, Shomurodov and others 2007). But a single map showing the vegetation cover of the dried bottom of the Aral Sea is absent.

At the end of the last century A. Ashurmetov, S. Kamalov, and others drawn a geobotanical map (scale 1:100000) of the drained bottom of Fishermen's Bay using traditional and distance methods. The map, covered 162 thousand hectares, shows vegetation of Uchsay village area (vegetable complexes cattail -reed and cattail in the backwaters), where gas production is planned. In this work the authors for the exposed bottom of the Fishermen's Bay separated 43 associations, relating to 11 formations and 4 types.

For the evaluation of the process of succession and the current state of vegetation of the exposed bottom of the southern part of the Aral Sea in the background of map of vegetation in 2005-2007. within the frames of international project we have put 2 profiles - Muynak № 1 and № 2 (northern part o Muynak peninsula).

As a result of soil and geo-botanical studies and in the process of decoding KFS along the put profile Muynak № 1 the following NTC were identified:

- hilly habrs on depressions with salt marshes (along the original shores),
- undulating hilly saline sandy blocks,
- undulating salted drifted habrs (anemoarenyte),
- barchan sands,
- cortical salt marshes,
- puffy salt marshes,
- naked underwater relict rocky hills,
- leveled wet salted sandy coastal ridges along the sea with a seashell and dry sea grass (*Zostera*),
- waste water flooded areas (tugai).

It was found that a large area on the northern part of the survey area is occupied by the cortical, puffy salt marshes with individual specimens *Atriplex fominii* and annual *Bassia hyssopifolia, Climacpotera aralensis, Suaeda crassifolia,* where full-scale re-adjustment is required. Only on drifted mounds occur shrubs *Tamarix hispida, Eremosporton aphyllum, Phragmites australis*. In the vicinity of the Lazerov island on hilly sands rarefied brushwoods are met, which do not fall along the profile, they are registered on the vegetation map.

Along the environmental profile Muynak № 2 (from the Tiger Tail to the water boundary of the sea. Coordinates of the reference point (start): № $43^{0}56^{I}38,3^{II}$ water boundary № $44^{0}04^{I}02,2^{II}$, E $58^{0}34^{I}56,7^{II}$) after full-scale adjustment and cameral analysis 8 NTC were revealed:

- hilly sands
- levelled undulating sands
- salted sandy blocks
- cortical salt marshes
- puffy salt marshes
- bogs along the Aral Sea (4-5 km wide)
- flooded areas (tugai)
- anthropogenic disturbed areas (artificial plantations, geological works).

As can be seen, within the second profile barkhan sands are not found, but the bag is found along the sea.

From the original bank along the profile Muynak № 2 forest plantations occupy large areas: on the left side of the profile Muynak № 2 from the original bank planting in 1998 of *Haloxylon aphyllum, Salsola richteri, Calligonium caput-medusae* - 530 hectares, on the right and left side of the profile of planting the same forest crops in 2003 - 4200 ha. In these areas because of the plowing surface the borders of coastline deviation and trends of development of all NTC components are violated, in particular of vegetation succession of plants.

Accordingly the above NTC along the profile Muynak № 2 10 most widespread plant communities are identified, within the 4 types of vegetation: halophytes, gypsophytes, psammophytes and tugai. The vast majority of plant groups listed below are found along the profile Muynak № 1.

- hilly habrs on depressions with salt marshes (along the original shores),
- undulating hilly saline sandy blocks,
- undulating salted drifted habrs (anemoarenyte),
- barchan sands,
- cortical salt marshes,
- puffy salt marshes,
- naked underwater relict rocky hills,

- leveled wet salted sandy coastal ridges along the sea with a seashell and dry sea grass (*Zostera*),
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- levelled undulating sands
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- bogs along the Aral Sea (4-5 km wide)
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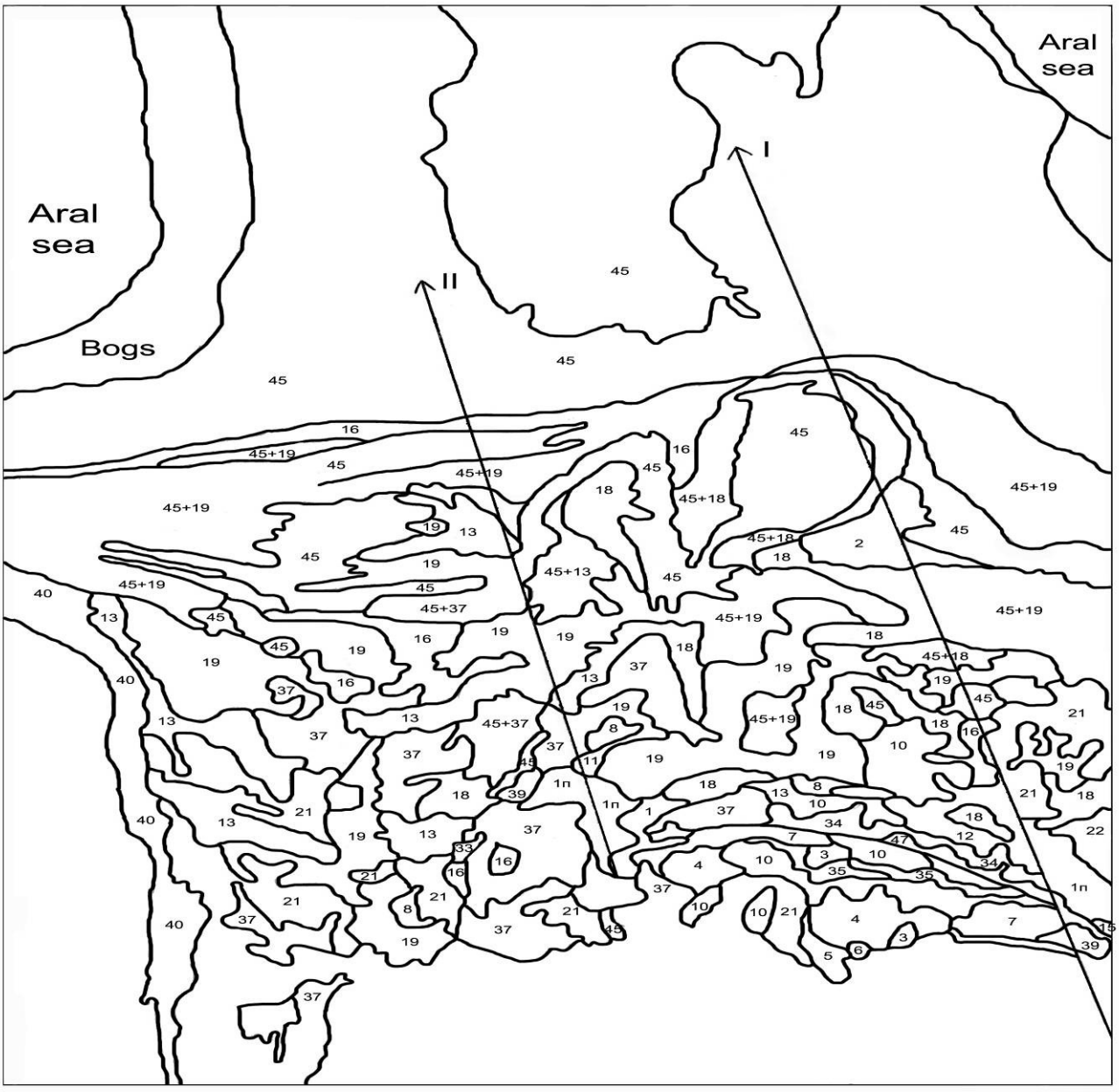
The following associations are widespread along the profile:

- Calligonum aralense, C.caput-medusae, C.junceum, C.eriopodum, Carex pachystylis, Poa bulbosa, Climacoptera aralensis, C.olgae, Salsola dendroides, Suaeda crassifolia, Calligonum planting in some places.
- Halostachys belangeriana, Salsola orientalis, S.paulsenii, Tamarix hispida, Haloxylon aphyllum.
- Artemisia diffusa, A.turanica, Salsola paulseniiii, S.nitraria, Climocoptera aralensis, Poa bulbosa, Carex pachystylis, Ammodendron conollyi, Astragalus villosissimus (on board of the desiccated sea).
- Haloxylon aphyllum, Halostachys belangeriana, Salsola richteri, S.nitraria, S.paulsenii, Peganum harmala (mainly plantings).
- Haloxylon aphyllum, Tamarix hispida, T.laxa, Salsola richteri, Alhagi pseudalhagi, A.sparsifolia.
- Bassia hyssopifolia, Climacoptera aralensis, C.crassa, Phragmites australis, Haloxylon aphyllum, on depressions.

- Tamarix hispida, T.pentandra, Bassia hyssopifolia, Salsola foliosia, Suaeda crassifolia, Phragmites australis, desiccated Salsola in some places.
- Tamarix hispida, T.ramosissima, Phragmites australis, Haloxylon aphyllum.
- Phragmites australis, Typha angustifolia.
- Calligonum aralense, C.junceum, C.eriopodium, Tamarix hispida, T.pentandra, T.ramosissima, Haloxylon aphyllum, Eremosporton aphyllum, Phragmites australis, Alhagi pseudalhagi, Salsola paulsenii, Climocoptera aralensis, Nitraria sibirica, under cliff, not marked along the profile.

The current status of plant communities is reflected on the map "Vegetation" and in the legend to it (Fig. 1), compiled using satellite data.



1. Mixto-Calligoneta

1. *Calligonum aralense, C.caput-medusa, C.junceum, C.eriopodum, Carex pachystylis, Poa bulbosa, Climacoptera aralensis, C.olgae, Salsola dendroides, Suaeda crassifolia, Astragalus villosissimus, in some places with naked drifted sands.*

1П. Forest plantation (Haloxylon aphyllum, Salsola richteri, Calligonum aralense).

2. Aristideta pennatae

2. *Aristida pennata, Atriplex fominii, Climacoptera lanata, C. aralensis, Salsola paulseniiii, Eremosporton aphyllum, in some places with Tamarix hispida, T.ramosissima.*

3. Salsola richteri

3. *Salsola richteri, Ammodendron conollyi, Salsola orientalis, S.paulsenii, Tamarix hispida, Haloxylon aphyllum.*

II. GYPSOPHYTA

4. Artemisieta diffusae

4. *Artemisia diffusa, A.turanica, Salsola paulseniiii, S.sclerantha, Climacoptera aralensis, Poa bulbosa, Carex pachystylis, Ammodendron conollyi, Astragalus villosissimus.*

5. Astragaleta villosissimus

5. *Astragalus villosissimus, Tamarix hispida, Climacoptera aralensis, Atriplex fominii, Suaeda crassifolia, in some places with Peganum harmala.*

6. Peganeta harmalae

6. *Peganum harmala, Tamarix hispida, Haloxylon aphyllum), in some places with Halostachys belangeriana.*

III. HALOPHYTA

On uplands and dried part of the Aral Sea bottom.

7. Haloxyleta aphylli

(in some places plantings of Haloxyleta aphylli)

7. *Haloxylon aphyllum, Halostachys belangeriana, Salsola richteri, S.nitraria, S.paulsenii, Peganum harmala, with plantings of Haloxyleta aphylli.*
8. *Haloxylon aphyllum, Salsola richteri, Tamarix hispida, Peganum harmala, Alhagi pseudalhagi, Phragmites australis.*
9. *Haloxylon aphyllum, Peganum harmala, Artemisia scoparia, Xanthium strumerium, Acroptilon repens, Phragmis australis.*
10. *Phragmis australis, Haloxylon aphyllum, Peganum harmala, Salsola deserticola, S.gemascens.*

8. Halostacheta belangerianae

11. *Halostachys belangeriana, Atriplex fominii, Climacoptera aralensis, Salsola paulseniiii, Tamarix hispida, T.ramosissima.*

9. Climacoptera aralensis

12. *Climacoptera lanata, C. aralensis, Atriplex fominii, Tamarix hispida, Nitraria sibirica, N.schoberi, naked sands and salt marshes in form of spots.*
13. *Bassia hyssopifolia, Climacoptera aralensis, C.crassa, Atriplex fominii, Phragmites australis, Tamarix hispida, Haloxylon aphyllum.*
15. *Salicornia europaea, Bassia hyssopifolia, Atriplex fominii, Tamarix hispida, Phragmites australis, along flooded areas.*
16. *Climacoptera lanata, C. aralensis, Atriplex fominii, Salsola foliosia, Phragmites australis, Tamarix hispida, T.ramosissima, Haloxylon aphyllum.*

IV. POTAMOPHYTA
on saline sands and along water basins
10. Tamariceta hispidae et T.ramosissimae

18. Tamarix hispida, T.ramosissima, Eremosporton aphyllum, Bassia hyssopifolia, Atriplex fominii, Salsola foliosia, Suaeda crassifolia, Phragmites australis.
19. Tamarix hispida, T.ramosissima, Halostachys belangeriana, Atriplex fominii, Bassia hyssopifolia, Phragmites australis, in some places naked sands and salt marshes.

11. Phragmiteta australis

21. Phragmites australis, Atriplex fominii, Tamarix hispida) with Typha angustifolia in some places, with Karelinia caspica at edges.
22. Phragmites australis, Bassia hyssopifolia, Climacoptera aralensis, Tamarix hispida, T.ramosissima.

COMPLEXES AND COMBINATIONS

34. Haloxylon aphyllum, Salsola richteri, Ammodendron conollyi and Tamarix hispida, T.laxa, Lycium turkomanicum.
34II – in some places lines of planting of H. aphyllum.
35. Halocnemum strobilaceum, Halostachys belangeriana, Climacoptera aralensis, Suaeda crassifolia and Tamarix hispida, T.laxa, Salsola richteri, Eremopyrum orientale, Anisantha tectorum, Strigosella africana, Haloxylon aphyllum, Ammodendron conollyi.
37. Bassia hyssopifolia, Atriplex fominii, Climacoptera aralensis, C.olgae and Phragmites australis, Tamarix hispida, T.ramosissima, Haloxylon aphyllum, Salsola richteri.
39. Haloxylon aphyllum, Salsola richteri, Peganum harmala and Tamarix hispida, Alhagi pseudalhagi.
40. Haloxylon aphyllum, Salsola richteri, Tamarix hispida, T.ramosissima, Nitraria sibirica, N.schoberi at stony bottoms of the Cliff and Calligonum aralense, C.eriopodum, C.caput-medusa, Strigosella africana, Poa bulbosa, Aristida pennata, Salsola paulseniiii, S. sclerantha.
45. Bassia hyssopifolia, Climacoptera aralensis, C.crassa, Atriplex fominii.
45+13. Bassia hyssopifolia, Climacoptera aralensis, C.crassa, Atriplex fominii, Phragmites australis, Tamarix hispida, Haloxylon aphyllum.
45+18. Tamarix hispida, T.ramosissima, Eremosporton aphyllum, Bassia hyssopifolia, Atriplex fominii, Salsola foliosia, Suaeda crassifolia, Phragmites australis.
45+19. Tamarix hispida, T.ramosissima, Halostachys belangeriana, Atriplex fominii, Bassia hyssopifolia, Phragmites australis, naked sands in some places.
45+37. Bassia hyssopifolia, Atriplex fominii, Climacoptera aralensis, C.olgae and Phragmites australis, Tamarix hispida, T.ramosissima, Haloxylon aphyllum, Salsola richteri.
47. Alhagi pseudalhagi, Zygophyllum sp.

Vegetation of the contract area on the dried bottom of the Aral Sea. On salt marshes and drifted naked sands of the Surgil project area Tamarisk formation is registered. As a part of this formation Tamarix hispida, T.ramosissima, Eremosporton aphyllum association is highlighted. Botanical composition of the association consists of the following species: *Tamarix hispida, T.ramosissima, Etemosporton aphyllum, Bassia hysopifolia, Atriplex fominii, Salsola foliosia, Suaeda crassifolia, Phragmites australis,* etc.

On the territory of the project site Uchsay 2 types of vegetation are marked - *Psammophyta* and *Gypsophyta*. Composition of the first type describes Salsola richteri, Ammodendron conollyi, Salsola orientalis, S.paulsenii, Tamarix hispida, Haloxylon aphyllum

related to Salsola richteri. The composition of gypsophyte vegetation identifies Artemisia diffusa, A.turanica, Salsola paulseniiii, S.sclerantha, Climacoptera aralensis, Poa bulbosa, Carex pachystylis, Ammodendron conollyi, Astragalus villosissimus, Astragalus villosissimus, Tamarix hispida, Climacoptera aralensis, Atriplex fominii, Suaeda crassifolia, in some places with Peganum harmala and Peganum harmala, Tamarix hispida association, referring respectively to the formations of spreading wormwood, Atriplex fominii, Suaeda crassifolia and Peganum harmala.

Rare species of plants listed in the Red Book, found in the contract area.

1. *Malococarpus crithmifolius (Retz.) C.F.May*. Status 2. Rare relict species. Spread on the Ustyurt plateau. Outside of Uzbekistan can be met in Kazakhstan, Turkmenistan, Iran. Habitat: gravel, saline soils near freshwater and mineralized spring.

2. *Tulipa buhseana Boiss.* Status 2. Spread in Aral deserts. Habitat: sandy and clayey soils of plains and foothills.

3. *Euphorbia sclerocyathium Korov.et M.Pop.* Status 2. Spread on Ustiurt, in the neighborhood of wells Tabansu, village Karyn-Yaryk, village Barsekelmes. Outside of Uzbekistan can be met in Turkmenistan. Habitat: stony and sandy deserts, salt marshes, saline gray-brown soil.

4. *Salsola chiwensis M.Pop.* Status 3. Relict species of the Northern Uzbekistan. Spread on Ustyurt and relict mountains Kyzyl Kum. Outside of Uzbekistan can be met in Turkmenistan. Habitat: on gray-brown gypsum and marl soils.

In addition to the above species on the dried Aral seabed the following endemic species not covered by the Red Book are found which need protection: *Artemisia austriaca Jacq., Atriplex pratovii Sukhor. and Crambe edentula Fish. et Mey.*

Analysis of the above data shows that it is necessary to conduct scientific studies to determine the presence of rare and endemic plant species in the area where production of gas and laying gas pipelines are planned; to organize collection of seeds of rare and endangered plant species and carry out their planting on ecologically similar habitats. Another effective method for conservation of rare species is transplantation of bushes (shrubs) to their appropriate habitats. It is advisable to conduct annual monitoring and assessment of vegetation condition in areas where gas production is planned. In the case of reduction of biomass sowing seeds of native species should be conducted in order to reduce the rate of desertification.

Fauna of vertebrates

The modern fauna of the Aral-Caspian desert is formed from the remnants of the Indo-Himalayan fauna, settlers from the south (Persia), and haloarktic - from the north.

The beginning of zoological researches in the Central Asia was based on the journey to Bukhara in 1820 by E.A. Eversmann. During the trip, researchers passed Greater and Lesser Badgers Sands, Aral Karakum desert, the Gulf Kamyshly on Aral Sea, Sapaque sands, Mesopotamia, through Kuvandarya and Dzhanadarya, went to Kyzyl Kum desert. In this expedition E.A. Eversman had obtained lizards new for the science of the time: Phrynocephalus interscapularis and Eremias grammica.

Study of herpetofauna of Ustyurt and the Aral Sea was held in 19-20 centuries by such great scientists as E.A. Eversmann, E.I. Eichwald, N.A. Severtsov, M.N. Bogdanov, A.M. Nikolskiy, N.A. Zarudny etc.

One of the first researchers of Turkestan and the first, who had penetrated into the Trans-Caspian region, was E.I. Eichwald. In the years 1825-1826 he traveled the Caspian Sea, was to the west of Ustyurt, examined the old bed of the Amu Darya, visited Astarabad, Mazanderan, Gilyan. During the trip E.I. Eichwald had gathered rich zoological collections. He described the Turkestan cobra, Phrynocephalus reticulatus, Caspian gecko, etc.

In 1874 at the initiative of M.N. Bogdanov the Petersburg Society of Naturalists decided to organize the Aral-Caspian expedition to explore the animal world. O.A. Grimm, V.D.

Alenitsyn and M.A. Butlerov also took part in the expedition. For the first time flora and fauna of the Aral and Caspian seas, the valleys of the Amu Darya were carefully studied.

In 1886, A.M. Nikolskiy studied the fauna of the Aral Sea and Ustyurt. Through its collections, as well as collections of N.A. Zarudniy, A.P. Fedchenko and N.A. Severtsov he wrote several works on amphibians and reptiles of the Turkestan area.

In 1914 N.A. Zarudniy made a trip to the Aral Sea. After visiting the Aral Sea N.A. Zarudniy (1915) wrote that it "on the part of the faunal study was a stepchild among the rest of the Turkestan region. Information about the fauna of the Aral Sea was sporadic, or related only to limited groups of the animal kingdom". In "Journey to the Aral Sea" N.A. Zarudniy (1915) wrote that the fauna of the Aral Sea includes 3 species of amphibians and 28 species of reptiles. Collections of N.A. Zarudniy added the list of V.S. Evpatevskiy "Reptiles of Aral Sea" (1903) with 9 species of reptiles. Also by the results of this trip N.A. Zarudniy published a monograph "Birds of the Aral Sea" (1915), which gives a list of migrant and nesting species.

In the 20-40th years of the 20th century, there was a pause in the zoological research of Ustyurt and the South http://multitran.ru/c/m.exe?a=110&t=4670505_2_1&sc=312Sub-Aral area. Active period of zoological research in Karakalpakstan began in the second half of the 20th century.

In 1944-1953 vertebrates of Ustyurt and ancient delta of the river Amu Darya were studied by V.P. Kostin. In 1956, V.P. Kostin published (upon collections of 1944, 1945, 1948, 1951-1953.) 4 papers which were devoted to faunal studies on the left bank of the lower course of the river Amu Darya from Khorezm oasis to the Aral Sea, Kunyadarya Valley and Ustyurt. These studies provide information on mammals, birds, reptiles and amphibians. For these animals habitat, spatial distribution, seasonal and daily activities are described. For many species the materials are provided on the biology features (reproduction, molting, feeding), behavior, notes about the ecological valence and enemies.

In the early 50's in the Amu Darya delta in the period of its optimal state the expedition of the Institute of Zoology and Parasitology of the Uzbekistan Academy of Sciences worked under the leadership of H.S. Salikhbaev (1950, 1959).

Since 1952 a famous Karakalpak zoologist A.M. Mambetzhumaev began the study of biology of goitered gazelle and saiga antelope in conditions of Ustyurt and Kyzylkum. From 1965 to 1973 they carried out researches on the expansion and ecology of Central Asian wild boar, Bukhara deer, Kyzylkum and Ustyurt goats. Simultaneously with the study of the expansion and ecology of plain ungulates in the Central Asia A.M. Mambetzhumaev simultaneously conducted research on expansion and ecology of reptiles, birds, and several species of carnivorous mammals of the valley of the Amu Darya, Ustyurt and Kyzyl Kum.

As a result of long-standing zoological researches Mambetzhumaev has deterined the composition of plants eaten by the Central Asian wild boar (82 species belonging to 30 families and 9 species of animals), Bukhara deer (129 species belonging to 33 families), gazelle (80 species belonging to 27 families), saiga (133 species belonging to 29 families), Ustyurt argali (88 species belonging to 22 families) and Kyzylkum argali (98 species belonging to 26 families).

In 1962-66 together with M. Palvaniyazov in the territory of Karakalpakstan, he studied the ecology, expansion and practical significance of Caffre cat, jungle and dune cats. In 1962-67 in collaboration with the same author - in the lower course of the river Amu Darya, on Ustyurt and in Kyzylkum he studied food of caragana fox (Vulpes vulpes karagan Erxleben), Turkmenian dog fox, Turkestan steppe polecat (Mustela eversmanni) and sand badger (1972).

A.M. Mambetzhumaev traced resettlement of ordinary lanes to the north of the Amu Darya, namely in the south of Karakalpakstan, Khorezm region and north-west of Bukhara region of Uzbekistan.

In the lower course of the river Amu Darya, he first discovered 14 species previously unknown for this region or absent in the lists of birds of Karakalpakstan: steppe redpoll, black and horned larks (1962), northern woodcock, slender-billed gull, imperial eagle, olivaceous

warbler, Turkestan blackbird, Turkestan pied bushchat (1964), aquatic warbler, rufous-backed shrike, Turkestan black redstart (1968), ordinary honey buzzard and white-necked nightingale (1970).

He was also engaged in studying the breeding biology of certain species of birds: red warbler (1965), common kestrel (1967), Khiva pheasant, Turkestan serpent eagle, Accipiter badius, striated scopiform, plain white-winged woodpecker (1968), Turkestan saker falcon, long-legged buzzard (1969), common ordinary black-crowned night heron, roody shelduck, mallard duck, common and small terns (1971), desert desert great gray, pied wheatear, Kazakhstan lesser whitethroat, red-headed bunting, Turkestan and Central Asian Stone House Sparrow, Indian oriole (jointly with T. Abdreymov, 1972) , Northern north black-winged stilt (jointly with M. Ametov, 1973), South south booted warbler (1974), Turkestan common nightingale (jointly with T. Abdreymov, 1974).

Together with T. Abdreymov and M. Ametov long-lasting (from 1969 through 1972) observations on spring phenology of birds (93 species) were conducted.

In reptiles in 1960 - 1970 in Kyzylkum close to Amudarya A.M. Mambetzhumaev studied food of Central Asian tortoise, after which eating by it of 84 species of plants belonging to 26 families (1972) were determined. Together with V. Lim in 1963-65 in Kyzylkum and on Ustyurt studies of food of sand boa, and quad-racer (1969) were conducted.

In 1966, A.M. Mambetzhumaev published materials about the past and present expansion of Kyzylkum and Ustyurt argali. According to him, and the southern and eastern cliffs of Ustyurt - the main habitat of Ustyurt argali.

Across Central Asia, including Ustyurt, O.P. Bogdanov collected amphibians, reptiles, mammals. In 1960 he published "Fauna of the Uzbek SSR", volume "Amphibians and Reptiles". It contains quite detailed information on the expansion, habitat, feeding, breeding and the practical significance of two species of amphibians and 56 - reptiles, including the area of Ustyurt and South Sub-Aral area.

Observations of V.P. Lim (1968) in 1965 and 1966 allowed to expand the boundaries of the range of water snake in Karakalpakstan. In 1971, he wrote about food of sand toad agama and reticulate desert lacerta in the vicinity of Nukus. V.P. Lim and O.E. Utemisov (1971) collected in the lower course of the river Amu Darya in 1969 and 1970 materials on habitats, hibernation, activity, reproduction, molt and enemies of fast desert lacerta.

O.E. Utemisov (1973) in 1970-1971 studied reptiles - the inhabitants of the cultural landscape in the area of Nukus, Tahtakupyr, Kungrad, Turtkul, Chimbay (lower Amu Darya). Among the species examined there are fast desert lacerta, desert lidless skink, plate-tailed gecko, steppe agama and sand toad agama. Together with O.P. Bogdanov and A.V. Bogachev, he studied food of steppe agama in Karakalpakstan (1973). Later, O.P. Bogdanov and O. Utemisov (1986) studied the ecology of plate-tailed gecko in the lower course of the river Amu Darya within Amu Darya oasis. In the lower course of the river Amu Darya T. Abdreimov (1973) investigated the food composition of barred and http://multitran.ru/c/m.exe?a=110&t=3621049_2_1&sc=3Pallas' coluber.

From 1962 to 1973 M. Palvaniyazov was collecting materials on predatory beasts of the deserts of Central Asia. He conducted researches on Mangyshlak, Ustyurt, in Sub-Aral Karakum and Kyzyl Kum. On Ustyurt stationary studies were held in the north in the vicinity of the meteorological station Kosbulak, in the south - Boychagyr and on the eastern cliff, in the lower course of the river Amu Darya – in the territory of the left bank of coastal riparian woodlands to the cliff of the Ustyurt. The results of these studies are summarized in the monograph "Wild beasts of Central Asia deserts» (1974).

Since 1974 M.B. Ametov studied the ecology of birds in conditions of human-caused changes in landscape. The results of his long-term researches are presented in more than 40 publications. Of them the main books are "Birds of Karakalpakstan and their protection" (1981) and an illustrated album "The nature of Karakalpakstan" (1986).

In the early 90's R.V. Lukashevich conducted research on the effect of changes in the hydrological regime on the population of breeding birds in the lower course of the river Amu Darya. Moreover, special attention he paid to Karadzhar lake system. On these materials there are publications and doctoral dissertation has been defended (Lukashevich, 1986).

Analyzing the expansion and ecology of cheiropterous animals of Uzbekistan N. Volozheninov (1986) gives the following information for the Southern Sub-Aral Sea area: greater horseshoe bat *(Rhinolophus ferrumequinum Scheber, 1774)* found on the southern cliffs of Ustyurt, whiskered myotis *(Myotis mystacinus kuhl, 1819)* found on the eastern cliff of Ustyurt, on the western shore of the Aral Sea, lake Sudochye; common pipistrelle *(Vespertilio pipistrellus Schreber, 1774)* found in the vicinity of Kungrad, Nukus, in Khiva oasis; brown bat *(Vespertilio serotinus Schreber, 1774)* at the wells on Ustyurt, in Nukus, two-color brown bat *(Vespertilio murinus Linnaeus, 1758)* - on the western shore of the Aral Sea in the vicinity of Yangikurgan.

In general, by the 80th the general picture of the fauna of the region has been delineated. In accordance with the analysis of published data and materials of scientific collections of the Institute of Zoology of the Uzbekistan Academy of Sciences the fauna of the region includes 2 species of amphibians, about 35 species of reptiles, about 300 species of birds, 65 species of mammals. The richness of biodiversity of vertebrates in the region based on these data is shown in Figure 2.

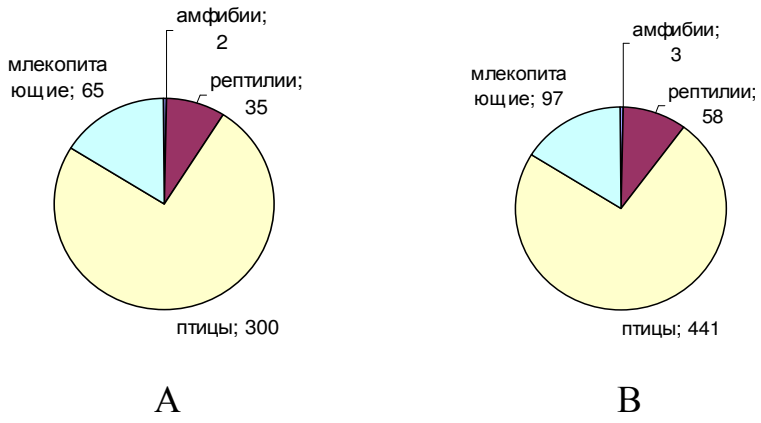


Figure 2. Characteristics of the biodiversity of terrestrial vertebrate species in the Southern Sub-Aral area (A) and Uzbekistan in general (B).

Until recently, the southern coast of the Aral Sea and the Amu Darya delta have been a unique space accumulations of wetland birds for the diversity and abundance. This was facilitated by exceptionally favorable conditions for nesting and location of the region on ways of mass migration of birds. In recent decades, due to reduced area of the Aral Sea and drying of many lakes the avifauna of the Southern sub-Aral area has suffered significant damage. Nevertheless, the water basins in this region have not lost their exceptional importance for migrating and nesting species of wetland birds.

It is estimated that the southern Sub-Aral region is inhabited by 118 hydrophilic species of birds, belonging to 8 orders and 13 families. In waters of the lower course of the river Amu Darya 57 species of birds nestle, belonging to the orders *Podicipidiformes* (5 species), *Pelicaniformes* (4), *Ciconiiformes* (1910), *Anseriformes* (1915), *Falconiformes* (3), *Gruiformes* (4), *Charadriiformes* (18) species (Atadjanov et all, 1999).

The system of moist areas of the South Sub-Aral Sea area is still an essential region in ornithological relation, with global significance for conservation of biological diversity of wetland ecosystems, even far beyond Central Asia. It is located on the historical path of mass

migration of birds from the Western Siberia to the Caspian and African wintering grounds. In connection with the regression of the Aral Sea importance of basins of the Southern Sub-Aral area, including wetland Sudochye has increased significantly. The spatial expansion of birds and the directions of the main migratory movements have changed, nesting populations of hydrophilic species bacame to focus primarily on delta water basins.

Specific conditions of use of natural resources in the second half of the 20th century led to intensification of the process of desertification: desiccation of the Aral Sea, degradation of deltas of the rivers Amu Darya and Syr Darya, salinization and degradation of arid rangelands and irrigated lands. At the dried bottom of the Aral Sea a kind of desert landscape is formed with elements of sand dunes covered by psammophytes and salt deserts, almost devoid of vegetation. These areas are populated mostly by rodents - carriers of plague infection.

In recent years, many lake systems of the Amu Darya delta have dried out. Areas and tigai and reed arrays serving as habitats for many species of animals, have strongly degraded. All the gulfs of the Aral Sea have dried out, which served as spawning grounds of commercial fishes. This led to the destruction of indigenous wildlife habitats, disruption of the balance of the Southern Sub-Aral Sea area ecosystem and biodiversity of flora and fauna.

Various species of mammals in a different way respond to changes in the landscape. Some species (cheetah, striped hyena, Turanian tiger, Kyzylkum buck, Bukhara deer, etc.) eliminated from the fauna of the Khorezm oasis and its surrounding deserts in the process of intensification of agriculture and the development of agricultural systems. Other species (jackrabbit, pest rat, fox, jackal, badger, etc.), due to environmental plasticity, adapted to the conditions of intensive farming, their number has not significantly changed. The preservation of these hunter-commercial species enables the reproduction of their stocks. These species should be considered perspective for hunting farms of the studied anthropogenic landscape, although their number currently does not allow conducting planned catching. It should be noted that even populations of ecologically plastic species in areas where irrigated farming has been used for many years are in a depressed state. In the most developed agricultural lands many species have become rare, occupying mainly the outskirts of fields, the banks of irrigation canals and reservoirs, as well as lands unsuitable for reclamation and island sands. Some species of rodents are becoming common, and numerous in some places on the outskirts of the oasis, bordering with the desert and the area adjacent to the cliff. For species adapted to living in synanthropic conditions (house mouse, brown bat, common pipistrelle, pest rat), increase of anthropogenic pressure, is even favorable, and they are becoming common species in agricultural lands.

Birds also had their own reaction to the changes of their native habitats and environmental conditions. From the delta of the river Amu Darya and parched lake systems, many species of wetland birds have moved on waste lakes located in the central and southern regions of Uzbekistan. In the developed area synanthropic semi-synanthropic species of birds began to dominate. This contributed to a broad expansion of such alien species, as collared turtledove and mynah.

Habitat of animals on the Ustyurt plateau has relatively little changed. But here in recent years in connection with the development of communications, construction of industrial facilities, the increased activity of extractive industries, as well as increasing level of poaching a disturbance factor has significantly increased, that could not affect the status of the fauna of this area.

Currently, many species of animals inhabiting the region have become rare and included in the National Red Book and an international list of species under threat of global destruction. Such species as the Turan tiger Panthera tigris and Asian cheetah Acinonix jubatus have completely disappeared.

The national Red Book includes 13 species and subspecies of fish, 4 species of reptiles, 37 species of birds and 8 species of mammals (Table 2).

Table 2. List of species of vertebrates of the Southern Sub-Aral Sea region, included in the national Red Book and an international list of species under threat of extinction.

Species of animals	Uzbekistan Red Book	International list of species under threat of extinction
Barbel sturgeon - *Acipenser nudiventris*	+	+
Syr Darya shovelnose – *Pseudoscaphirhynchus fedtschenkoi*	+	+
Little Amu-dar shovelnose - *Pseudoscaphirhynchus hermanni*	+	+
Big Amu-dar shovelnose – *Pseudoscaphirhynchus kaufmanni*	+	+
Aral silvereye - *Abramis sappa aralensis*	+	
Pike-like asp - *Aspiolucius esocinus*	+	
Aral barbel – *Barbus brachycephalus brachycephalus*	+	
Turkestan barbel - *Barbus capito conocephalus*	+	
http://multitran.ru/c/m.exe?a=110&t=4264380_2_1&sc=195Ostroluchka	+	
Turkestan orfe - *Leuciscus idus oxianus*	+	
Aral spined loach – *Sabanejewia aurata aralensis*	+	+
Aral salmon trout - *Salma trutta aralensis*	+	+
Aral stickleback – *Pungitius platygaster aralensis*	+	
Central Asian tortoise -*Agrionemys horsfieldi*		+
Molchanov's toad agama – *Phrynocephalus moltschanovi*	+	
Chentaun's Toad Agama – *Phrynocephalus rossikovi*	+	
Desert monitor - *Varanus griseus*	+	
Four-lined snake -*Elaphe quatiorlineata*	+	
Great white pelican - *Pelecanus onocrotalus*	+	
Dalmatian pelican - *Pelecanus crispus*	+	+
Little cormorant - *Phalacrocorax pygmaeus*	+	+
Little egret - *Egretta garzetta*	+	
Pond heron - *Ardeola ralloides*	+	
Spoonbill - *Platalea leucorodia*	+	
Glossy ibis - *Plegadis falcinellus*	+	
Flamingo - *Phoenicopterus roseus*	+	
Mute swan - *Cygnus olor*	+	
Hooping swan - *Cygnus cignus*	+	
Lesser White-fronted Goose - *Anser erythropus*	+	+
Red-breasted goose - *Rufibrenta ruficollis*	+	+
Marbled duck - *Marmaronetta angustirostris*	+	+
White-eyed pochard - *Aythya nyroca*	+	+
Stifftail - *Oxiura leucocephala*	+	+
Fish-hawk - *Pandion haliaetus*	+	
Pallas' sea eagle - *Halyaeetus leucoryphus*	+	+
White-tailed eagle -*H.aliaeetus albicilla*	+	
Neophron – *Neophron percnopterus*		+
Black vulture - *Aegypius monachus*	+	+
Harrier eagle - *Circaetus gallicus*	+	

Species of animals	Uzbekistan Red Book	International list of species under threat of extinction
Pale harrier -*Circus macrourus*	+	+
Steppe eagle - *Aquila rapax*	+	
Greater spotted eagle - *Aquila clanga*	+	+
Imperial eagle - *Aquila heliaca*	+	+
Golden eagle - *Aquila chrysaetus*	+	
Red-footed falcon - *Falco vespertinus*		+
Naumann's kestrel - *Falco naumanni*	+	+
Saker falcon - *Falco cherrug*	+	+
Peregrine Falcon - *Falco peregrinus*	+	
Bustard - *Otis tarda*	+	+
Houbara bustard - *Chlamydotis undulata*	+	+
Black-winged pratincole - *Glareola nordmanni*	+	+
Sociable lapwing - *Chettusia gregaria*	+	+
Double snipe – *Gallinago media*		+
Slender-billed curlew - *Numenius tenuirostris*	+	+
Curlew -*Numenius arquata*		+
Black-tailed godwit -*Limosa limosa*		+
Asian dowitcher -*Limnodromus semipalmatus*	+	+
Great black-headed gull - *Larus ichthyaetus*	+	
Pin-tailed sand grouse - *Pterocles alchata*	+	
Roller – *Coracias garrulos*		+
Brandt's hedgehog - *Hemiechinus hypomelas*	+	
Heptner's Pygmy Jerboa – *Salpingotus heptneri*	+	
Honey Badger - *Mellivora capensis*	+	
Caracal - *Caracal caracal*	+	
Turkmenian Kulan - *Equus hemionus kulan*	+	+
Goitered gazelle - *Gazella subguturossa*	+	+
Saiga - *Saiga tatarica*		+
Trans-caspian Urial - *Ovis vignei arkal*	+	+

The international list of species under global threat of extinction included 6 species of fish, 1 species of reptiles, 20 nesting species and 12 occurring during the migration of birds and 4 species of mammals.

Trends in change of the composition of fauna of vertebrates in the studied area show that it directly depends on the impact of anthropogenic factors. Most clearly it is observed for rare species. From rare animal species the Southern Sub-Aral Sea area in the 80-s was inhabited by species such as goitered gazelle, mouflon and others. Information on the expansion of rare species in this period, was collected in 1977 and 78 by V.A. Popov (1981). Below we summarize the data on this source of information:

Goitered gazelle *Gasella subgutturosa Guld.* n the Sub-Aral Sea area has been found in the saline and gypsum deserts. It was regularly noted in 1977-78 in the area of the lakes Sudochye and Saksaulsay. Hunter from Muynak reported that during those years gazelles were passing sometimes in winter on dried bottom of the Gulf Adzhibay to Muynak Peninsula.

Mouflon *Ovis orientalis Evers.* was noted on 05.12.1977, 30 kilometers north of the village of Urga. 3 specimens were having rest on ledges of the cliff. Their footprints were found on the terraces and gentle slopes of the cliff with Poa plants.

Marbled polecat *Vormela peregusna Guld.* 8.07.78 one in saline clay desert south of the village Kazakhdarya in the colonies of gerbils.

Dune cat *Felis margarita Loch.* 5.10.78 one was seen on saline sands with dry annual saltwort and glasswort vegetation in south-eastern part of Gulf Adzhibay.

Great white pelican *Pelicanus onocrotalus L* was met in groups of up to 15 birds, and in flocks from May to August on the saltmarsh near the dry riverbed Dzhansiz, to the east of the lake Sudochye; a large flock in the southern part of Akpetkin archipelago, on the sea shore at the northern tip of Cape Akala, at the northern part of the lake Sudoche near the village of Urga.

Dalmatian pelican *Pelicanus srispus Bruch.* was observed only in early July at the mouth of the river Kokdarya. Among great white pelicans there were 12 Dalmatian pelican, 5 of them were young.

Marbled duck *Marmaronetta angustirostris Menetr* was met as 2-3 species in May, July and August on drying lakes of the right bank of the river Amu Darya between villages Zair and Shakhman, near the lake Darkashkol north-west of the village Porlatau and on the lake Zakirkul south of the village Shege.

white-tailed eagle *Haliaeetus albibilla L.* In early July, two birds were marked on the west cliff of the hill Beltane near the lake Karateren.

Pallas' sea eagle *Haliaeetus leucoryphus Pall)* was observed in June, July, August and October in young trees and bushes tugais on the left bank of the duct Urdabay-Ozek at its confluence into the sea, on the coastal salt marsh south of the Cape Akala, on a sandy beach of the south-western part of the Aral Sea, in desiccated tugais of dry riverbed of Erkindarya river to the west of the village Shakhman. Under the tree where the bird was sitting two pellets with the bones and skull of sand eel were found.

Harrier eagle *Circaetus ferox Gm.* Singles were observed in mid-May at the cliff of Ustyurt, 31 km north of the Cape Urga in early August on the west bank of the lake Sudochye.

Pallas sand grouse *Syrhaptus paradoxus Pall.* In mid-May three birds were seen flying at night from the lake Sudochye deep of Ustyurt from a triangulation point “Kyzylkair Mound”; in early July, a flock of 14 birds was met in the gypsum desert 3 km to the west of Saksaulsay. The birds were flying westward toward Barsa-Kelmes.

Mute swan *(Cygnus olor Gm.)* In early June, five birds were met on the shores of the Aral Sea at the mouth of the river Kokdarya and in early August - seven in the northern part of the lake Sudoche 300 meters from the village Urga.

Desert monitor *(Varanus griseus Daud.)* In early July, singles were met north of Beltane Upland, on the sandy array of the Cape Akala, on the coast of the Aral Sea 1 km to the South-West of the hill Aybys on saline desert with fragments of moundy sands.

Comparison of the full list and data of A.V. Popov points to a significant reduction in the number and spatial expansion of rare species in the region.

Anthropogenic impact on the fauna of the region had greatly affected ungulates. After construction of the railway Kungrad-Beynau and the gas pipeline Central Asia - Center in different years lambing of Saiga was carried out in different places depending on pastures and availability of watering on Ustyurt, including in 1984 at the Eastern cliff (R. Reimov, M. Karabekov, 1987). Features of reproduction of Ustyurt saiga population and measures for its protection were the subject of increased attention of zoologists and environmental institutions. Despite the heightened interest in the issue in subsequent years, to date Ustyurt saiga population has almost completely degraded, which was significantly contributed by poaching.

The above information reflects the unique fauna of the region of the Southern Sub-Aral Sea area. Moreover, the Ustyurt plateau is most important for globally threatened species of birds and mammals.

The problem of desertification of the south of the Aral Sea and the change of theriofauna was considered by Reymov R., M. Karabekov and Kh. Uteshov (1987). Desertification of the Amu Darya delta led to the displacement of moisture-loving species of rodents (followed by

jackal and jungle cat) to the shores of reservoirs and nearby areas occupied by sown crops (rice, melons). Many mesophilic mammals (badger, etc.) began to settle in artificial plantations along roads and canals. Desertified territories of the delta are settled by sand eels, jerboa, and yellow ground squirrel. Of rodents tamarisk gerbil and midday gerbil, house mouse bacame numerous. Lesser jerboa and lesser five-toed jerboa. Which, depending on the nature of vegetation and soil cover up to 30-40% in the captures, of predators - jackal, jungle cat, and badger. Fox and weasel, can be met very rarely, formerly quite numerous, marbled polecat; number of wild boars is relatively high. Hare-tolai, eared hedgehog, and in the buildings - common pipistrelle and brown bat. Penetration of desert species is especially noticeable, such as long-clawed ground squirrel, Libyan and greater jird and certain species of jerboas at the edges of the delta (formerly Archipelago Akpetkey, Aybugir and surroundings of Urga).

The studies conducted on the project of restoration of ecosystem of the lake Sudochye were conducted in 1999-2002. During this period here have been observed singles and small groups of saiga coming to drink water to the lake. At Sarchin ridge gazelle was met and traces of this species were found. By polling information in this period on Ustyurt poaching of saiga was flourishing. We have repeatedly found on the plateau old skulls of saiga with sawn-off horns.

Studies on the fauna of the territory of the dried part of the southern shore of the Aral Sea started in the 80-s by scientists from Karakalpakstan. Kh. Azhimuratov in summer of 1979, 80 and 86. studied populations of birds at the former bottom of the Aral Sea (1988), where he identified several types of habitats.

Coastline of the sea. In 1979 and 1980 22 species were noted with an average strength of 380.7 sp/sq.km. Sandpipers were met in the largest amount. Mallard. Red-crested pochards, black-headed gulls and terns. Common cormorants. In 1986, on the same route - 12 species of 280,0 sp/sq.km., little stint, herring gull dominated; northern phalarope, pelicans, sandpipers, common tern, black-headed gull, Kentish plover, turnstone were numerous.

Sandy Desert. It is a sandy plain with hillocks and ridge-hummocky sands in the form of gray sands of marine sediments. The vegetation is very poor, almost naked flat terrain, in some places rare shrubs of seepweed and goosefoot can be met. 5 species of birds were noted, the number of 8,0 sp/sq.km. Red-capped lark, Isabelline chat, Kentish plover. Dikkop and herring gull are rare.

Herbaceous brushwood. Represent the association of annual herbaceous plants: glasswort, goosefoot, seepweed, saltwort. This biotope occupies a significant part of the dried bottom of the sea, mostly flat places. Due to the proximity of suspended water and high content of organic matters Chenopodiaceae and other short grasses are rapidly growing, which serves as habitat for many different kinds of birds. The average number is 138,5 sp/sq.km. Of those noted by us 12 species are the most numerous, red-capped lark, crested lark, common shelduck. The remaining species are represented in small quantities.

Grass scrubs. Biotope mosaicly occupies vast plain open spaces in association of Chenopodiaceae vegetation. Where there are more moisted lands, or in separate streams in the mouth of the Amu Darya. This biotope is mainly located on the terrace of the sea of the 60's and 70's. Vegetation is represented by herb-Tamarix association and Asiatic poplar with Karelinia (akbas), Salsola paulsenii, tick-seed, cenahum Siberian and goosefoot, in rare cases, reeds or Bolboschoenus. This small area attracts about 18 species of birds. Among them red-headed bunting, booted warbler, black-headed wagtail, red-capped lark numerically dominate, bank swallow, pied wheatear, herring gull, Isabelline chat, sand eel are numerous, Khiva common pheasant, House Sparrow, great gray, black swift, roody shelduck are ordinary. In some places there are isolated species of barn swallow.

Riparian woodlands. This biotope is mainly formed from the growing stock of Asiatic poplar, Elaeagnus with tamarisk, salt tree, buckwheat, desert thorn and other shrubs. Saxaul forest is characteristic for the coast in the north-eastern part of Ustyurt and Akpetkin archipelago,

occupying the terrace of the sea in 1960-70, located close to the living sea. It creates a unique landscape with a predominance of wood forms. Forests arrays of Asiatic poplar, Elaeagnus and other scrubs are typical for area of the mouth of Amu Darya River, a live stream of the river Amu Darya and its duct. Former reed spills are occupied by tugai phytocoenosises. There are 11 species of birds. The average number is 276.5 sp/sq.km. The most abundant are booted warbler, whitethroat, Khiva common pheasant, rufous warbler, Bukhara tomtit, great gray, blue-cheeked bee eater, red-capped lark, Isabelline chat, red-headed bunting. In some places of haloxylon deserts located between the sea and the cliff Ustyurt, pied wheatear can be met.

Formation of theriofauna on the dried bottom of the sea (former bays Muynak, Adzhibay, Sarbaos, Abaza, Dzhaltyrbas, Karabayliy archipelago, etc.) in the opinion of R. Reymov, M. Karabekov and Kh. Uteshov (1987) is mainly connected with the formation of plant communities. Formation of fauna mainly occurrs due to xerophilic species, it is especially noticeable when analyzing the population of mammals of the areas Adzhibay-Tiger's tail (south-west coast of the sea) and Mergen-Atau-uyaly (East Coast). Invasion of these sites is due to fauna of Ustyurt and Northwestern Kyzyl Kum with such regularity: in sands (dunes) and puffy salt marshes - a greater, red-tailed and midday gerbils, long-clawed ground squirrel, hairy-footed jerboa, etc. In the loamy soils and salt marshes - tamarisk and midday gerbils, house mouse, some species of jerboas, as well as big-eared hedgehog, tolai hare and some species of predatory animals.

Depending on the depth of groundwater and soil, this area is overgrown with Salicornia immediately after its release from the water. Mammals appear here since the second year. In the first place house mouse intrudes, in some places pest rat, and lamellidont Kirghiz field mouse (closer to the delta), tamarisk gerbil, dwarf hamster, gradually - eared hedgehog, tolai hare; sometimes boar comes. Of predators after rodents fox, jackals, badgers, etc intrude.

Reduction of natural potential and environmental degradation caused by the decline in the Aral Sea level, and desertification of the Amu Darya delta negatively affect the number of moisture-loving species, and fauna is formed by psammophiles.

1.3 Environmental restrictions

Unique flora and fauna complexes of the project site distinguish by fragility and high level of vulnerability. Ecosystems of the Ustyurt plateau and its cliffs are subjected to easy fracture under the influence of anthropogenic factors. The processes of recovery are stretched on for decades, if at all possible. Changing of ecosystems of the Aral Sea is on the way of degradation. Therefore, only conservation of natural complexes on large spaces, which are habitats for plants and animals, can ensure preservation of biodiversity of the project area.

One of approaches to biodiversity conservation is the creation of specially protected natural territories (PNT). Areas where mining is conducted in accordance with the Law on Nature Protection of Uzbekistan can not remain in the PNT. However, their proximity may have a negative impact on the components of biodiversity.

In close proximity to the pipeline planned under the project there is a lake Sudochye, which has the status of state ornithological reserve. In its territory hunting and activities are prohibited, which can damage inhabiting populations of birds. Since 1971, this lake has had international status of the Ramsar water basin, important for the conservation of water and near water bird species under global threat of extinction and clusters of waterfowls. In connection with Uzbekistan independence in the legal order this status was lost. The studies conducted in the framework of the project of Global Environment Fund and the World Bank to restore the ecosystem of the lake Sudochye (1999-2002) reaffirmed the compliance of this reservoir with criteria of the Ramsar Convention. As a result a package of documents was prepared for re-

inclusion of this territory in the Ramsar list of water basins of international importance. 18 species of birds living here are included in the Red Book of the Republic of Uzbekistan.

Today, the lake Sudochye has international status of the most important ornithological area (Kreitzberg, 2008). At the lake 230 species of birds were registered, of which 12 are under global threat of extinction. Of these, Dalmatian pelican *Pelicanus crispus* nests here, white-eyed pochard *Aythya nyroca*, stifftail *Oxiura leucocephal*, imperial eagle *Aquila heliaca*, Naumann's kestrel *Falco naumanni*, saker falcon *Falco cherrug*, black-winged pratincole *Pratincole Glareola nordmanni*, and on the contiguous territory houbara bustard *Chlamidotis undulata* and roller *Caracias garrulus*. During the migration, the lake is visited by greater spotted eagle *Aquila clanga*, Asian dowitcher *Limnodromus semipalmatus* and slender-billed curlew *Numenius tenuirostris.* The lake supports 21 species of birds, represented here by a large number of more than 1% of a biogeographic population. During the migration here can be found a shelter of 32 to 86 thousand of hydrophilic species of birds that stop to rest and to replenish energy during the flight. The lake Sudochye is included in the international network of key areas on the Central Asian Flyway (CASN).

In connection with the foregoing, the Project should provide for the possibility to exclude contact of UGCC waste water with the nearby lake Akushpa, a member of Sudochye system of lakes.

The project implementation process envisages construction of pipeline and power lines. Implementation of these activities will lead to the destruction of the soil surface on the pipeline route that will affect the reduction of places suitable for the existence of plant communities and some species of animals. In the area, of 25 mammal species, one (gazelle) is included in the Red Book of Uzbekistan and three (dwarf hamster, gazelle and saiga) in the list of endangered of the International Union for Conservation of Nature (IUCN). Of 23 species of reptiles the Red Book of Uzbekistan includes desert monitor. This area is also inhabited by terrestrial breeding species of birds listed in the Red Book of Uzbekistan: pin-tailed sand grouse and houbara bustard. The second type is also included in the List of Endangered of the International Union for Conservation of Nature.

To minimize the negative impacts resulting from the excavation and laying of dirt roads it is necessary to comply with the rules for conducting such operations, limiting free movement of equipment near the tracks.

Construction and operation of transmission lines can also cause bird deaths, especially medium and large sizes (harriers, buzzards, eagles, falcons, etc.), among which, as a rule, rare and endangered species dominate, that have conservation status. These species are observed in the project area during the nesting season and during seasonal migrations. In certain seasons, the transmission line may pose a risk to migratory birds that migrate over the Ustyurt plateau at very low altitudes. During the construction of transmission lines the measures to reduce risk to birds should be envisaged.

The foregoing has been affirmed in international conventions and agreements signed by the Republic of Uzbekistan and aimed at preserving biological diversity. These include the International Convention on Biological Diversity (CBD), for desertification (Combat Desertification), for Conservation of Migratory Species of Animals (CMS, Bonn), for conservation of wet habitats and waterfowls inhabiting them (Ramsar), and a number of agreements under the Convention CMS: to protect the African-Eurasian migrants (AEWA), for the Siberian Crane (MoU Siberian Crane), for the slender-billed Curlew (MoU Slender-bill Curlew), a tripartite agreement on saiga (Russia, Kazakhstan, Uzbekistan) and others.

2. METHODS OF FIELD RESEARCH OF BIODIVERSITY

Researches to assess the status and possible impact of Project implementation on biodiversity components were carried out at 6 representative areas, including both areas of the deposits Surgil, northern Berdakh, eastern Berdakh, the planned Ustyurt Gas-Chemical Complex (UGCC) and the necessary communications (pipeline to transport gas and condensate, power lines, roads).

As indicators of the biodiversity status of the project area flora and fauna have been studied. Gathering materials for the components of biodiversity represented by vegetation and vertebrates, including reptiles, birds and mammals, was conducted mostly using conventional geobotanical and zoological methods of field research. The peculiarity of this study was to fix geographical coordinates of meetings of animals and plants for subsequent mapping.

Condition of habitats was fixed on the photo for comparison with possible changes in the course of project implementation.

Points for the survey are identified the most characteristic plant associations and habitats of mammals, birds and reptiles. Their location is directly related to the presence of roads and the possibility of their approach. The specified points following the processing of the obtained materials can be recommended for monitoring the state of biodiversity of the contract area (Fig. 3).

Field researches of the flora and fauna of the contract areas were held from 2 to 6 July 2010. This period on the researched territory is characterized by high aridity level accompanied by extremely high air and soil temperature and complete lack of rainfall. In this period the growing period of the majority of species of herbaceous plants is terminated, activity of vertebrate animals falls sharply. Many animals spend the daytime in shelters. Dates of field works coincided with the end of the breeding season of most species of vertebrate animals, hibernation of some species (the Central Asian tortoise, yellow ground squirrel) and the transition to a predominance of nocturnalism for the others (snakes, carnivores). This greatly complicated the conducting of flora and fauna studies, due to inability to detect many types of plants and animals in this period of the year.

During the field works six fields were surveyed with total area of 26,360.0 ha: Surgil field (6233 ha) is located in the southern part of the former bottom of the Aral Sea; Uchsay field (6,408.7 ha) is represented by the sandy desert and located 20 km to the south-west of the Field Surgil; fields Karatereng (1,176.5 ha), Taily (1,592.6 ha) and Akushpa (3,150.5 ha) are included into Sudochin system of lakes, near to which the pipeline passes closest in the area of the site Akushpa; UGCC field (7798.5 ha) is located on the south-eastern cliff of the plateau Ustyurt.

The field studies involved Botany specialists (faunal, geobotany) and zoologists (herpetology, ornithology, mammalogy). Field studies were of short duration and were conducted by a stationary-route method with the use of special equipment, field equipment (tents, sleeping bags, camp belongings) and two UAZ cars - van and UAZ - flatbed.

Figure 3. Location of areas of work

Travel routes of the expedition for the study of biodiversity:

July 1: Moving from Nukus to Kungrad (overnight in Kungrad, mobilization to leave);
July 2: Kungrad – Uchsay field, processing Uchsay field, overnight;
July 3: Uchsay field (morning registration) moving to Surgil field, processing Surgil field and moving to Karatereng field, evening registration, overnight;

July 4: processing Karatereng field, moving to Taily field, processing Taily field;
July 5: moving to Akushpa, processing Akushpa field, overnight, camping – near the pipeline

July 6: moving to UGCC field, processing UGCC field, return to Kungrad, Nukus and Tashkent.

Study of vegetation.

The basis of the studies of biodiversity of vegetation is observations at representative points on botanical route.

As a methodological framework, the traditional methods of geobotany and ecology were used, as set out in the classic manuals: Field geobotany (1959-1972); Brief guidance on geobotanical research (1952); Communities and ecosystems (Whittaker, 1980); Quantitative ecology of plants (Greig-Smith, 1967). Particular attention was paid to the systems approach. In describing the plant communities species composition, plant height, abundance on the scale of B.M. Mirkin, location by B.A. Bykov (1978), phenological phase, projective cover, the number of individuals of dominant species were taken into account. Field researches on the vegetation of the contract area (fields Uchsay, Surgil, Karatereng, Taily, Akushpa and Ustyurt Gas Chemical Complex) were conducted to assess the current state of various types of habitats of major vegetation types, to specify the species composition, to determine the number and spatial expansion of basic edificators, as well as endemic, relict, rare and endangered species and those included into the Red Book of Uzbekistan, relatives of cultivated plants.

A special feature of this study was obligatory fixation of geographical coordinates of meetings of rare red-listed species of plants.

Determination of floristic composition and spatial expansion of plant associations was accompanied by visual observations, photography and keeping field diaries.

The condition of habitat of vegetation cover was fixed on the photo for comparison with possible changes in these areas during the project implementation.

To carry out field works special equipment was used: field glass, tesha, shovel, digital camera, determinant directory, Herbarium grid, cartographic materials (topographic kats and printed satellite images of the program "Google", GPS Garmin "ETREX".

Preliminary points of study of vegetation cover were identified in the most characteristic areas of its expansion. Since the state of vegetation cover is directly related to the existing and planned industrial load, field studies were tied to the project areas of Uz-Kor Gas Chemical activities.

The specified points following further specification and processing of the obtained materials will be recommended for botanical monitoring of the contract area.

Zoological Research.

Methods of faunal studies are specific in nature depending on the studied objects. The peculiarity of this research is that, in connection with the specific behavior of animals, features of their daily activity and the period of fieldwork in the region inappropriate for the climatic conditions, gathering material for the mammal fauna, avifauna and herpetofauna was limited to the low level of activity of the observed objects.

Walking route counts on the transect conducted in the early morning and late evening hours, corresponding to the highest daily animal activity, in contrast to the spring season, when animals are active much longer time, especially reptiles are active in the late morning and during the day.

Depending on the characteristics of animal ecology registration was produced by direct visual observations without and with the aid of optical instruments - binoculars and telescope, and by indirect evidence (by characteristic voice, presence of traces, burrows, nests and traces of fossils in the form of excavation, excreta, and pellets, etc.) or, finally, through capture (photo 3).

Photo 3. Night capture of mammals. Severtzov's Jerboa.

Field researches on *avifauna* of the contract areas were conducted in the period which in duration (from 2 to 6 July) coincides with the completion of the nesting period of almost all bird species in this region. The conducted studies clarified the species composition, abundance and spatial expansion of background, rare and endangered bird species in the contract areas and to compile a map-scheme of their spatial expansion. During the field works six fields were examined: deposits Surgil, northern and eastern Berdakh, areas where it is planned to build Ustyurt Gas-Chemical Complex (UGCC) and the necessary communications. The field Surgil is located on the southern part of the former Sub-Aral Sea area; the field Uchsay is represented by sandy desert and located 20 km to the south-west of the field Surgil near the tip of the peninsula Tiger's tail; the fields Karatereng, Taily and Akushpa are located on the east of the Ustyurt plateau, bounded by eastern cliff, adjacent to Sudochin system of lakes; UGCC field is located on the south-eastern cliff of the plateau Ustyurt.

Ornithological study of the territory was conducted by conventional zoological and ornithological methods (Novikov, 1949; Howes J., Bakewell D., 1989). Studies of avifauna were conducted in the specified points and on the routes. In the stationary points the adjacent territory from prevailing heights was reviewed, using a telescope, as well as registration on the standard transects using 10-fold binoculars (photo 4). Standard transect involves varying width of the registration line, depending on the size of birds. For small species (small passerines), it is 50 m, for medium (sandgrouse) - 200 m and for large ones (Eagles) - 500 m.

The length of transects in the field Uchsay was 5 km, Surgil - 2 km, Akushpa -2 km, UGCC -7 km. At fields Karatereng and Taily studies were conducted in the waters of reservoirs from the prevailing heights.

Birds - the inhabitants of reservoirs were counted in separate points from capes and prevailing heights (Howes J., Bakewell D., 1989), thus trying to cover all the main places of their concentration. This method is used for the determination of the studied reservoirs of species composition and the absolute number of hydrophilic birds in the aquatory.

Photo 4. Count of the transect

Photo 5. Count with a telescope

The results of counts on transect are extrapolated for the area of 1 km2, for counts at stationary points and reservoirs are given actual data without extrapolation for the area.

The counts were carried out mainly in the early morning and evening hours when the birds were active. This makes it possible to obtain data that best reflect the real situation.

In order to clarify the species composition of birds during the movement from one field to another road counts were carried out and the species composition was determined in the territories adjacent to the selected sites. Total length of auto counts was 126 km. Results of auto counts in the report are presented in the form of actial data and in terms of linear km.

To determine the species of birds at distance optical instruments were used: 10-fold binoculars "Viking" and the telescope "Meopta" with zoom ensuring 30-80 fold increase (Figure 5). Also special determinants were used with quality color images of birds with marked patterns of symptoms, including a description of votes (L. Svensson, P.J. Grant, K. Mullarney, D. Zetterstrom, 2004). Names of orders and species of birds correspond to L.S. Stepanian (1990).

Binding to the area was carried out using topographic maps with Scale: 1:200000 and a navigator GPS Garmin eTrex.

When conducting field research on *herpetofauna*, definition of species composition of reptiles and amphibians was carried out, their abundance, spatial expansion, including places of concentration. The state of habitats was described and photographed. Field research was carried out by standard herpetological methods (Novikov, 1949). The primary method of research is stationary route. In the contract territory in accordance with different types of habitats points of routes of research were identified.

Photo 6. Tools of herpetologist.

Quantitative count on transect was built based on the environment of counted species, landscape-geographical conditions and the season. Counting of species was carried along more or less long line, on either sides of it, and the duration of counting was determined by either time or a certain distance. With regard to the width of the line of counting, it was not clearly fixed, but was determined solely by the distance which enables reliable identification of animals by ear, naked eye and binoculars, so this line for different types is equal to several meters or tens of meters.

But more often the counting was carried out at a certain distance from the main line, the bigger or smaller, depending on the nature of the terrain and species composition. Route counts at which the area is crossed at more or less considerable distance is called transect.

The transects were laid in a quite typical and monotonous terrain, to facilitate the subsequent conversion of the obtained data for the whole area of the studies habitat.

The total length of route counts in the studied areas was about 80 km where only 12 species of reptiles of 5 species were found. To capture reptiles special equipment (photo 6) was used. For mapping the meeting places of reptiles navigator GPS Garmin eTrex was used.

To collect data on mammals (*teriological studies*) conventional methods of field zoological research by the method of walking and vehicle counts with fixed count lines were used (Novikov, 1949; Kashkarov, Pavlenko, 1975) and special methods (“Manual for counting the numbers of rodents for antiplague institutions of the Soviet Union”, 1978). To study rapacious and other animals of nocturnal habits, road counts were conducted at night using headlamps (Kashkarov, Pavlenko, 1975) (photo 7).

Photo 7. Counting nocturnal mammal with a headlamp.

In order to clarify the species composition and determine the number of mammals living on the contract area (six fields studied) eight transects were placed for walking route counts of the total length of 31,3 km. Also during the field works conducted 10 vehicle counts were conducted, the length of which amounted to 210 km. Two counts for 55 km were conducted at night with the use of additional light (a headlamp). During these counts catching jerboas was conducted to determine their species with subsequent release of on site of capture. When conducting the count in transects footprints, burrows, colonies and traces of vital functions of different species also were observed.

Also, when traveling between the fields studied vehicle counts were carried out on the former bottom of the Aral Sea and on the Ustyurt plateau. These data are needed to clarify the species composition of mammals in habitats similar to the studied fields in relation to their small area and the limited time given for field studies. During the day, 8 vehicle counts were conducted, the length of which amounted to 155 km. Two of these with the length of 20 km were conducted within the studied fields and 6 vehicle counts with the length of 135 km on the territory between the fields with partial coverage of land area.

At the field Uchsay on 02.07.2010 evening route count for 5 kilometers and a width of the count line from 20 (for small rodents) to 60 m (hare tolai) was conducted, which was passing the fixed sands and clay-gypsum desert. During the count residential and non-residential colonies, townships and holes were fixed, as well as encountered animals.

At the field Surgil 2 morning route counts. On 02.07.2010 near the village of gas workers 1,8 km long and on 03.07.2010 on the south-western border of the field of 1,5 km length on the former bottom of the Aral Sea.

At the field Karatereng on 03.07.2010 evening count was conducted in the western direction on clay plaster desert with the length of 7 km.

At the field Akushpa on 04.07.2010 evening walking route count with the length of 5 km was conducted in the clay-gypsum desert.

At the field UGCC walking route count was conducted on 05.07.2010 in the western direction from the parking lot of 4 km length.

The conducted studies allowed clarifying the species composition, abundance and spatial expansion of background, rare and endangered species of plants and vertebrates on the contract area and using GIS possibilities to compile map-schemas of the territorial expansion of birds and plant communities.

The studied fields can be recommended for monitoring biodiversity status of the contract area.

3. RESULTS OF FIELD RESEARCHES OF VEGETATION AND VERTEBRATES OF THE CONTRACT AREA

3.1 Uchsay field

Vegetation

Point 1. Coordinates 43° 49′ 25.9 N, 58° 52′ 13.7 E. The key area is located north of the village Uchsay, on the former Tiger Tail Peninsula. The soil cover is represented mainly by small-and medium-bumpy sand. Sands with small black pebbles, an uneven microrelief. The vegetation is represented by Peganum harmala association with the participation of ephemers and ephemeroids. The composition of plant communities is represented by tamarisk, sandhill wattle, Nitraria, peganum (photo 8), anabasis-salsa, dodartia, groundsel, pinch beetles (photo 8), sedge grass, Salsola paulsenii, Aeluropus, Climacoptera aralensis, goosefoot, butter tree and others.

Photo 8. Harmala shrub - Peganium harmala

Photo 9. Ceratocarpus arenarius

Point 2. Coordinates 43° 50′ 00.6 N, 58° 52′ 18.4 E. The point of monitoring study is located near the point 1. The key area is located in the northwestern part of the village Uchsay, on the former Tiger Tail Peninsula. The soil cover consists mainly of medium bumpy sand. Sands with small black pebbles, an uneven microrelief. The vegetation is represented by Peganum harmala association with the participation of ephemeras and ephemeroids. The composition of plant communities is represented Salsola arbuscula, sandhill wattle, Nitraria, Ephedra, Salsola arborea, Alhagi, harmala shrub, anabasis-salsa, groundsel, pinch beetles, sedge grass, Salsola paulsenii, Aeluropus, butter tree, Climacoptera aralensis, Coroline caspica, Erempyrum buonapartis, cibol (individual dry copies).

Point 3. Coordinates 43° 50′ 38.7 N, 58° 52′ 10.2 E. This key area is represented by sand and bumpy desert with herb Artemisia terrae–albae (photo 10) and, in some places, clay desert. The communities by the species composition are similar to point 2. The vegetation is represented by gypsophilic and psammophilous species, in addition, here ephemeras sand ephemeroides are met. In the key area Haloxylon-Artemisia and Gramineou-Artemisia associations are met. Here there are several kinds of cereals, Climacoptera and Alhagi, groundsel, Salsola paulsenii, goosefoot, butter tree. Of shrubs 4 species of Haloxylon, Salsola arbuscula, goat's-wheat and bindweed. Plant associations are mosaic. Of ephemeras cibol, pinch beetles, Eremopyrum buonapartis are met.

Photo 10. Artemisia association

Point 4. Coordinates 43° 51′ 17.2 N, 58° 52′ 2.2 E. The point of monitoring study is located near the point 3. This key area is founded on herb Artemisia terrae–albae of sand and bumpy terrain and in the clay desert occurring in some places. The terrain is uneven, sand with fine pebbles. The vegetation is represented by gypsophilic and psammophilous species, in addition here ephemeras sand ephemeroides are met. In the key area Haloxylon-Artemisia and Gramineou -Artemisia associations are met. Here there are several species of graminaceous plants (Stipa, reed, Aeluropus) and saltworts, Climacoptera aralensis, goosefoot, swine's-bane and Alhagi, groundsel, heliotrope and bindweed. Of shrubs, Haloxylon, Salsola arbuscula, Atraphaxis, tamarisks (2 species). Plant association is mosaic. Of ephemeras, cibol, pinch beetles, Eremopyrum buonapartis are met.

Point 5. Coordinates 43° 51′ 25.7 N, 58° 51′ 47.8 E. This key area is located on natural H. aphyllum association. The vegetation is represented by typical psammophilous species. Pure H. aphyllum association. Here, in addition to Haloxylon aphyllum and anabasis-salsa there are several species of saltworts, ephemeras and ephemeroides. Of shrubs, Salsola arbuscula, Atraphaxis, tamarisk, Nitraria. Saxaul with the height of 3,6-4,2 m. Haloxylon community. The vegetation is represented by psammophilous and gypsophilic categories: Salsola arbuscula, Salsola rigida, Cornulaca korshinskyi (photo 11), heliotrope, and dried residues of ephemeras and ephemeroids (pinch beetles, Eremopyrum buonapartis). Around haloxylon desert Salsola rigida grows, there are some bushes of Alhagi, Coroline caspica, Climacoptera, goosefoot, seepweed, butter tree.

Photo 11. Cornulaca korshinskyi

Vertebrate animals

Herpetofauna. This area is characterized by a combination of underdeveloped gray-brown mostly slightly loamy and sabulous slightly saline soils and non-saline desert sandy soils. Among the deserted sandy soils arrays of semibound sands are typically distributed. Relatively leveled and fixed by buckwheat, tamarisk and saxaul vegetation, in some places with ephemeras. The sandy surfaces are characterized by underdeveloped desert sandy soils with very low natural fertility.

To our knowledge this area is inhabited by 10 species of reptiles and 1 species of amphibians (Table 3). In the examination of the contract area on 07.02.2010 we found 2 species of reptiles: a steppe agama (*Trapelus sanguinolentus*) and two striped racerunners (*Eremias lineolata*). All encountered reptiles were hiding in the base of shrubs and in burrows of rodents.


Photos 12, 13. Uchsay field

Table 3. List of species of reptiles and amphibians at the field Uchsay

Coordinates of fields studied	Animal species	Time of meeting	Air t	Soil t	Animal body t
N 43º 49.425’ E 58º 52.220’ Height 51 m	-	-	-	-	-
N 43º 50.659’ E 58º 52.171’ Height 76 m	Steppe agama *Trapelus sanguinolentus* ♀	14.30	41,9 º	51,8 º	-
N 43º 51.285’ E 58º 52.034’ Height 70 m	Striped racerunner *Eremias lineolata*	14.45	42,3 º	50,3 º	-
- // -	Striped racerunner *Eremias lineolata*	14.59	39,9 º	42.1 º	-

Also at this field Uchsay village is located, consisting of wattle-and-daub houses. On the territory of the village herpetofauna facilities were not met.

Poverty of the herpetofauna detected is due to the season, characterized by high temperatures of soil and air, not quite suitable for conducting such research, because during this period reptiles are little active, some species bury in sand or hide in caves and therefore they are difficult to detect.

Avifauna. The habitats of animals in the Uchsay field are presented by hilly clay desert with detrital plots and drifts of sand with plants presented by perennial shrubs, sagebrush, Alhagi and sai bed with thickets of Haloxylon (photo 14).

In this field, one route count was carried out that covered sand-bed of sai and a plot of gravelly-clayey desert with drifts of aeolian sand, and 3 counts at points, one of which - in the village Uchsay (N 43°49.466' E 58° 53.398'), the second one - on gravelly site (N 43°50,006' E 58°52,184') and the third one - in the clay desert (N 43° 51.332’ E 58° 52.012’).

In the field 15 species of birds of 5 orders were observed: *Charadriiformes* (1), *Columbiiformes* (2), *Caprimulgiformes* (1), *Coraciiformes* (1) and *Passeriformes* (10).

Photo 14. Clay desert

Photo 15. Sai bed

The species composition is represented by species typical for such habitats: crested lark, black-bellied sandgrouse, blue-cheeked bee eater, desert warbler, etc. (Table 4).

Table 4 – Species composition and abundance of birds marked at the field Uchsay.

N	Species	Points of research			Transect 5 km (in conversion to 1 km^2)
		Uchsay village	Rock debris desert	Clay desert	
Charadriiformes					
1	Yellow-legged Gull *Larus cachinnans*				1
Columbiiformes					
2	Black-bellied sandgrouse *Pterocles orientalis*		1	9	7
3	Collared turtledove *Streptopelia decaocto*	2			
Caprimulgiformes					
4	Egyptian nightjar *Caprimulgus aegyptius*			1	
Coraciiformes					
5	Blue-cheeked bee eater *Merops superciliosus*	26	2	4	4
Passeriformes					
6	European swallow *Hirundo rustica*	10			
7	Crested lark *Galerida cristata*	7	2		28
8	Blue-headed wagtail *Motacilla flava*			1	
9	White wagtail *Motacilla alba*	1			
10	Great gray *Lanius excubitor*				8
11	Desert warbler *Sylvia nana*				12
12	Isabelline chat *Oenanthe isabellina*				4
13	Indian sparrow *Passer indicus*	9			
14	Tree sparrow *Passer montanus*	6			
15	Desert finch *Rhodospiza obsoleta*				4
	Number of species: (total: 15)	**7**	**3**	**4**	**8**

At the field there is Uchsay village (photo 16), which attracts synanthropic and semi-synanthropic bird species closely related to man, such as collared turtledove, european swallow и tree sparrow.

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Appendix J. Ecology – Botanical Report

1. ОБЗОР БАЗОВЫХ МАТЕРИАЛОВ ПО БИОРАЗНООБРАЗИЮ КОНТРАКТНОЙ И ПРИЛЕЖАЩЕЙ ТЕРРИТОРИИ

1.1 Растительность

Флористическое или видовое разнообразие и жизнеспособность определяют облик биологических возможностей, в конечном счёте, биопродуктивность растительного покрова, степень устойчивости всей экосистемы. Углублённые исследования разнообразия растительности позволяют выявить генезис флоры экологических особенностей растений, установить редкие и исчезающие виды, разработать научную основу их сохранения.

Устюрт резко изменился под влиянием опустынивания Приаралья. Создавшиеся экстремальные условия привели к ухудшению экологического комплекса, что резко повлияло на естественную растительность.

На восточном чинке Устюрта высохли родники и можаичники. Результаты исследований показывают, что снижение уровня Аральского моря отразилось на растительности в неодинаковой степени. Сильное влияние заметно в южной части приморской полосы в районе Урга, где практически отсутствует море, осушенная полоса восточного чинка составляет более 60-80км. В настоящее время здесь наблюдается трансформация растительности, сильно повреждены мезофильные луговые типы растительности.

Флора. По данным Е.П.Коровина и И.И. Гранитова (1949), флора каракалпакской части Устюрта исчисляется 165 видами цветковых растений, собранных экспедицией СаГУ в 1944-1945 гг. на плато и чинках. Из них 45 видов, или 27%, относятся к сем. Chenopodiaceae. Поскольку этот список был составлен на основе летних и осенних сборов, эфемеры и многие эфемероиды не были включены в данный список. Позднее коллекции флоры Устюрта пополнили сборы К.Койбагарова (1972), по данным которого общие число видов каракалпакской части Устюрта составляет 402. Автор охватывает более широкий район, включая песчаные массивы в северной части плато (Сам, Матайкум). Если исключить из списка 402 видов, приводимых в неопубликованной сводке К. Кайбагарова, виды, собранные на солончаках и песках, то при этом число видов, характерных для плато и чинков, составит 330. И в этом случае к сем. маревых относится 19,7% видов. Изучая флору восточного чинка Б.Сарыбаев (1981) приводит 302 вида. Позднее Б.Сарыбаев, Ш.Сапаров (1977) для северо-западного Устюрта указывает 406 видов. Наиболее достоверным данным по флоре каракалпакского Устюрта является работа А. Алланиязова, Б.Сарыбаева (1983). В этом труде для данного региона авторы приводят 406 видов растений, относящихся к 208 родам, входящих к 46 семейств. По данным А.Алланиязова (1995), на Устюрте по видовому разнообразию на первом месте находится семейства *Chenopodiaceae* (91), на втором *Asteraceae* (48), на третьем *Brassicaceae* (43), на четвертом Poaceae (27) и на пятом *Fabaceae* (24). В растительном покрове плато Устюрт удельный вес занимает многолетние травы, затем следуют: однолетники, полукустарники, кустарнички, двулетники, деревья и кустарники.

Несмотря на это видовой состав каракалпакского Устюрта изучен еще не в полной мере. Примером тому служит найденный нами новый вид *Allium usturtense* в ходе экспедиции на плато Устюрт в мае прошлого года.

Среди эндемов гипсовой пустыни можно указать на *Malacocarpus crithmifolius, Salsola chivensis* и *Sisymbrium subspinenscens*, встречающиеся на сильно гипсоносных почвах Устюрта.

Растительность. Растительный покров основных регионов гипсовой пустыни резко различается прежде всего по составу эдификаторов. На Устюрте по данным И.Ф.Момотова (1973) он слагается немногими видами, образующими монодоминантные сообщества, это *Salsola arbusculiformis, Anabasis salsa, Artemisia terrae-alba, Haloxylon*

aphyllum, Salsola orientalis. Реже доминантами и субдоминантами растительных сообществ являются *Salsola arbuscula, Atraphaxis spinosa, Stipa richteriana, S. hohenackeriana, S. Gemmascens, Nanophyton erinaceum.*

На юге Устюрта большие площади заняты однообразным растительным покровом биюргуновой ассоциации, создающей монотонно-серый фон на протяжении многих километров. Микрокомплексное сочетание ассоциаций биюргуна, полыни, боялыша и некоторых других растений в центральной и северной частях Устюрта придают растительному покрову оригинальные, нигде более в Узбекистане неповторяющиеся черты. В благоприятные по климатическим условиям годы, при хорошем отрастании растений, растительность Устюрта образует красивый ковёр из закономерно сочетающихся растительных ассоциаций.

Относительная бедность растительного покрова Устюрта травянистыми растениями, в частности эфемерами, находит отражение в ограниченности состава ассоциаций. Покров образует нередко один вид с равномерным размещением растений на всей площади ассоциации. Так часто выглядят ассоциации биюргуна, полыни, черного саксаула. Хорошо заметны на фоне полынников и боялышников *только Rheum tataricum, Atraphaxis spinosa* и *Stipa richteriana*

Растительный покров Устюрта, как и других гипсовых пустынь, его структура и динамика теснейшим образом связаны с условиями внешней среды. По мнению Е.П.Коровина (1949) после осушения сарматских толщ в миоцене Устюрт находился в зоне аридного климата. Заселение его территории растительностью происходило «за счет прибрежно-морской флоры». Растительные ландшафты на Устюрте формировались за счет растений первичной гамады и пестроцветной флоры (Попов, 1923), фрагменты которой сохранились в современном растительном покрове плато в виде редких видов. К ним Е.П.Коровин (1949) относит *Salsola chivensis, Sisymbrium subspinescens, Cleome noeana, Seseli tenuifolium, S. cuneifolium, Zigophyllum macropterum, Z.brachypterum, Z. eichvaldii, Z.turcomanicum.*

Основные формации и ассоциации Устюрта. Вьюнковая формация. И.И.Гранитов (1967) считает вьюнок кустарниковый реликтовым растением. На Устюрте известна одна ассоциация, где доминирует *Convolvulus fruticosus* – полынно-атрофаксисово-вьюнковая на серо-бурой гипсоносной почве. Участок этой ассоциаций описан недалеко от кол. Байчагыр. В списке растений ассоциаций Е.П.Коровин и И.И.Гранитов (1949) *отмечает Convolvulus fruticosus, Atraphaxis spinosa, Artemisia terrae-alba, Anabasis salsa u Stipa sp.*

В составе чернобоялышевой формации И.И.Момотов (1973) выделяет 2 ассоциации: чернобоялышевая и полынно-чернобоялышевая. Первая ассоциация характерна только для Устюрта, а вторая описана и в Кызылкуме. Флористический состав чернобоялышевой ассоциаций беден. Помимо *Salsola arbusculiformus* встречается: *Atraphaxis spinosa, Convolvulus fruticosus, Artemisia terrae-alba, Asparagus bresleriana, Stipa richteriana, Astragalus erioceras, Scorzonera pusilla, Rheum tataricum* и др. По мнению автора полынно-чернобоялышевую ассоциацию на серо-бурых почвах Устюрта можно рассматривать как переходную между боялышовой и полынной. Флористический состав и здесь беден и состоит всего из 7 видов. Кроме полыни и боялыша, отмечены *Stipa hohenackeriana, Anabasis salsa, Convolvulus fruticosus, Eremopyrum buonapartis, Ceratocarpus utriculosus.*

На серо-бурой почве Устюрта в составе белоземельнополынной формации Е.П.Коровин и И.И.Гранитов (1949) выделяют белоземельнополынную ассоциацию. Флористический состав этой ассоциаций небогат. Помимо полыни, кейрука и бюргуна в описанных участках отмечены *Stipa szowitsiana, Ceratocarpus utriculosus, Eremopyrum distans, Diptychocarpus strictus.* Позднее И.Ф.Момотов (1953) в составе этой же формации выделяет еще 2 ассоциации: атрафаксисово-ковыльно-белоземельнополынная (видовой состав состоит из 7 видов) и черносаксаулово-ревеново-белоземельнополынная.

Последняя ассоциация описана в районе кол. Косбулак в пологом понижении. Ботанический состав здесь довольно богат и состоит из 36 видов цветковых растений. Специфику флористического состава подчеркивает сравнительный низкий процент однолетников, что характерно для сообществ Устюрта.

Особо следует отметить биюргунники, занимающие на территории Каракалпакского Устюрта около 3,5 млн.га. Е.П.Коровин и И.И.Гранитов (1949) отмечают, что участки чистых биюргунников занимает несколько тысяч гектаров на юге Каракалпакского Устюрта в прилегающей к Сарыкамышу окраине, а также к северо-востоку от Барсакельмеса. На этих массивах бюргунники составляют 90-95%, а на севере 40-60%. В составе этой же формации И.Ф.Момотовым (1973) отмечены следующие ассоциации: биюргуновая, лишайниково-биюргуновая, водорослево-биюргуновая, тасбиюргуново-биюргуновая, тытрово-биюргуновая, боялышево-биюргуновая, кейреуково-боялышево-биюргуновая, полынно-биюргуновая, кермеково-полынно-биюргуновая.

Наиболее полную информацию о растительных сообществах Устюрта можно найти в работе А.Алланиязова (1995). Автор в пределах Каракалпакского Устюрта выделил 70 ассоциаций, относящихся к 19 формациям, 9 ценотипам и 5 эдафотипам.

Основные эдификаторы растительного покрова платоУстюрт.

Salsola arbuscula. Кустарник 50-100 см высоты. Один из широкораспостаненных видов кустарниковой растительности плато Устюрт, характерной для щебнистых, гипсоносных солончаковых почв.

Artemisia terrae-albae. Полукустарничек до 50 см высоты. Чистые заросли полынника широко распространены в южной части Устюрта. На севере встречается в смеси с биюргуном, кейреуком и другими растениями. Полынный ландшафт распространен по всему Устюрту.

Anabasis salsa. Полукустарничек до 8-35 см высоты. Широко распостренен по всему Устюрту. Сочно -суккулентный гало-гипсофит. Биюргуновые ландшафты -одна из характерных особенностей плато Устюрта.

Salsola arbuscula. Полукустарничек 30-50 см высоты, типичное ландшафтное растение гипсовых местообитаний с различной степенью засоления, гало-гипсофит, ксерофит с фиолетовыми листочками. Хорошое кормовое растение. Типичные кейреуковые сообщества встречается на Южном Устюрте, смешанные с различной пустынно-травянистой растительностью берегов Барсакелмес.

Convolvulus fruticosus. Кустарник 80-120 высоты, произрастает на Устюрте на каменисто-щебнистых местообитаниях. Кормовое растение. Поедается овцами, коэами и верблюдами в течение всей вегетации.

Haloxylon aphyllum. Пустынное дерево 1,5 -5 м высоты. Галофит. Ярко выраженный эдификатор из группы пустынной древеснюй растительности. Флористический состав черносаксаульников очень богат и насчитывается более 25 -27 видов. Устюртские саксаульники местные жители называли «каратюлей» (т. е. саксауловые джунгли). Массивы старых зарослей сохранились в окрестностях Чурука Косбулака, Саксаулсая. Неотносится к категории исчезающих растений, но неправильная заготовка приводит, к истощению его зарослей. Хорошее кормовое растение.

Tamarix hispida. Высокорослый кустарник 2,0-4,5 м высоты. Солевыделяющий талофит. Хорошое топливо. Опад не плохо поедается все животные осенью и зимой, генеративные .побеги-осенью и весной.

Halocnemum strobilaceum. Безлистный сочный кустарничек 30-60 см высоты. Галофит-эдификатор бессточный выпади Устюрта. Типичное местообитания-солончаки. Флористический состав его сообществ очень беден, чаще образует разреженные, иногда

сплошные заросли. На плато встречается .на солончаках бессточных впадин Барсакельмес, Ассакеаудан, Карашоре, Косбулакшоре, Сам, Асмантай-Матае и др.
Kallidium caspicum. Галофитный кустарничек 70-80 см высотой. Суккелентный ксерофит. Характерных эдификаторов солончаковых местообитаний самых разнообразных стадий формирования. Обычно встречается вокруг бессточных выпадин плато Устюрт.
Halirnocnernis villosa. Однолетная суккулентная солянка 15-35 см высоты. Эвксерофит, галофит. На плато Устюрт одн из характерных растений такыров. Ценится как хороший осенне-зимний нажировочный корм, особенно с участием климакоптеры мохнатой.
Climacoptera lanata. Однолетнее травянистое растение 10—40 см высоты. Самое ценное кормовое растение солончаковых пустынь. Типичные местообитания - опесчаненные низины, периферия засоленных такыров, часто встречается среди кустов саксаула.
Anabasis aphylla. Полукустарник 35-65 см высоты, безлистный суккелент. Характерные местообитания - такыровидные понижения. На плато Устюрт встречается разреженно в южной и центральной части.
Anabasis tukestanica. В растиельном покрове Южного Устюрта занимает доминирующее положение. Полукустарничек 35-40 см высоты. Стебель у основания толстый.
Ammodendron conollyi. На Устюрте встречаются 4 вида: A. conollyi, A. karelenii, A. longiracemosum, A. eichvalda. Все они типичные псаммофиты. Из них только только A. conollyi-эдификатор. Встречается на песчаных массивах.
Carex physodes. Многолетное травянистое растение, 15-24 см высоты, эфемероид. На Устюрте занимает обширное пространство, особенно на песчаных местах. Ранней весной появляется вместе с эфемерами. На плато среди эфемеров и эфемероидов доминирует илак.
Poa bulbosa. Многолетнее травянистое растение, эфемероид. Одно из основных кормовых растений Устюрта.
Rheum tatarcum. Многолетнее травянистое растение, эфемероид. Распространен на Устюрте на сыроватых солонцеватых почвах, местами встречается очень обильно. Одно из кормовых растений Устюрта.
Eremopyron orientale. Однолетнее травянистое растение. Широкораспространен по всему Устюрту на пресных песчаных почвах и песках. Одно из основных кормовых растений Устюрта.
Agropyron fragile. Многолетнее травянистое длительно вегетирующее растение с плотной и крупной дерниной 40-85 см высоты. Хорошее кормовое растение, относится к группе растений с весенно-летней вегетацией. Широкораспространен по всему платоУстюрта.

Растительность контрактной территории Устюрта.

Тайлы. По неопубликованным данным (Карта растительности Устюрта, составленной У.Алланзаровой, 1988 г.) на территории Тайлы зарегистрированы белоземельнополынно-биюргуновые комплексы на серобурых суглинистых, солончаковато-солонцеватых почвах. В составе данного комплекса выделена кейреуково-биюргуновая ассоциация, местами с участием *Nonophyton erenaceum* и *Artemisia terrae-alba* на солонцевато-солончаковатых почвах.

Акушпа. На серобурых суглинистых, солончаковато-солонцеватых почвах, как и на участке Тайлы, распространены белоземельно-биюргуновые комплексы. На мокрых солончаках отмечен ряд тростниковых-гребенщиковых-шоражрекоково-гребенщиковых солончаковатых сообществ. В составе данного ряда выделена тростниковая ассоциация с участием гребенщика *Tamarix elongate, T. laxa*.

На территории ***УГХК*** на суглинистых солончаковато-солонцеватых почвах У.Алланазаровой выделены биюргуново-белоземельнополынная и поташниковая ассоциация, местами с сарсазаном *Halimocnemum sp.,* входящие в состав биюргуново-белоземельнополынного комплекса.

Флора и растительность осушенного дна Аральского моря. На сегодняшний день научная литература не располагает достаточными сведениями о флоре и растительном покрове высохшей части Аральского моря. По последним данным (Шерембетов, 2009) флора юго-западной части (узбекская часть) осушенного дна Аральского моря насчитывает 135 видов цветковых растений, относящихся к 72 родам и 26 семействам, где преобладает сем. маревых, свойственных для всех пустынь Средней Азии.

Изучением процессов формирования ландшафтов, тенденцией развития отдельных компонентов природно–территориальных комплексов и картографирования растительных сообществ обнаженной части дна Арала занимались некоторые ученные (Ашурметов и др, 1998; Курбанниязов, 2000; Рафиков, 1998; Матжанова и др, 2006; Кузьмина и др. 2006). Имеется карта растительности для отдельных участков осушенного дна моря (Ашурметов и др., 1998, Шомуродов и др. 2007). Но единая карта, отражающая растительный покров всего осушенного дна Арала отсутствует.

На солончаках и навеянных голых песках проектной территории Сургиль зарегистрирована гребенщиковая формация. В составе данной формации выделена разреженно однолетносолянково-гребенщиковая ассоциация местами с эремоспортоном. Ботанический состав данной ассоциаций состоит из следующих видов: *Tamarix hispida, T.ramosissima, Etemosporton aphyllum, Bassia hysopifolia, Atriplex fominii, Salsola foliosia, Suaeda crassifolia, Phragmites australis* и др.

На территории проектного участка Учсай отмечены 2 типа растительности- *Psammophyta* и *Gypsophyta*. В составе первого типа описана гребенщиково-однолетносолянково-куянсуяково-черкезовая ассоциация с участием черного саксаула, относящиеся к черкезовой формации. В составе гипсофильной растительности выделены эфемероидово-солянково-смешаннополынная с кустарниками, однолетносолянково-гребенщиково-сингреновая, местами с адраспаном, и карабараково-гребенщиково-адраспановая ассоциация, относящихся соответственно к формациям раскидистой полыни, сингреновой и адраспановой.

Редкие виды растений, занесенных в Красную книгу, встречающиеся на контрактной территории.

1. *Malococarpus crithmifolius (Retz.) C.F.May*. Статус 2. Редкий реликтовый вид. Распространен на плато Устюрт. За пределами Узбекистана встречается в Казахстане, Туркменистане, Иране. Место обитание: галечники, засоленные почвы близ пресных и минерализованных родников.

2. *Tulipa buhseana Boiss.* Статус 2. Распространен на приаральских пустынь. Место обитание: песчаные и глинистые почвы равнин и предгорий.

3. *Euphorbia sclerocyathium Korov.et M.Pop.* Статус 2. Распространен на Устюрте, на окрестности колодца Табансу, посёлок Карын-ярык, селение Барсекельмес. За пределами Узбекистан встречается в Туркменистане. Место обитание: каменистые и песчаные пустыни, солончаки, засоленные серо-бурые почвы.

4. *Salsola chiwensis M.Pop.* Статус 3. Реликтовый вид Северного Узбекистана. Распространен на Устюрте и на останцовых горах Кызылкума. За пределами Узбекистана встречается в Туркменистане. Место обитание: на серо-бурых гипсованных и мергелистых почвах.

Кроме вышеуказанных видов на чинке и на осушенном дне Арала встречаются следующие незанесенные в Красную книгу эндемичные виды, нуждающиеся в охране: *Crataegus korolkowii L. Henry*, *Artemisia austriaca Jacq., Atriplex pratovii Sukhor*., и *Crambe edentula Fish. et Mey.*

Анализ изложенных выше материалов показывает, что необходимо провести научные исследования на предмет наличия популяции редких и эндемичных видов растений на территории, где планируется добыча газа и проведение газопроводов;

организовать сбор семян редких и исчезающих видов растений и провести их посев на экологически сходных местообитаниях. Другим эффективным методом, сохранения редких видов является пересадка кустов (кустарниковых растений) на подходящие им местообитаниях. Целесообразно ежегодное проведение мониторинга и оценка состояния растительности на территориях, где планируется добыча газа. В случае снижения биомассы следует провести посев семян аборигенных видов, с целью снижения темпов процесса опустынивания.

2. МЕТОДЫ ПОЛЕВЫХ ИССЛЕДОВАНИЙ БИОРАЗНООБРАЗИЯ

Исследование растительности. В основе исследований биоразнообразия растительного покрова заложены наблюдения на репрезентативных точках по ботаническому маршруту.

В качестве методической основы были использованы - традиционные методы геоботаники и экологии, изложенные в классических руководствах: Полевая геоботаника (1959-1972); Краткое руководство геоботанических исследований (1952); Сообщества и экосистемы (Уиттекер, 1980); Количественная экология растений (Грейг-Смит, 1967). Особое внимание было уделено системному подходу. При описании растительных сообществ учитывались видовой состав, высота растений, обилие по шкале Б.М.Миркина, размещение по Б.А.Быкову (1978), фенофаза, проективное покрытие, численность особей доминантных видов. Полевые исследования по растительности Контрактной территории (участки Учсай, Сургиль, Каратеренг, Тайлы, Акушпа и Устюртский газохимический комплекс) (рис. 1.)были проведены для оценки современного состояния различных типов мест произрастания основных типов растительности, уточнения видового состава, определения численности и территориального распределения основных эдификаторов, а также эндемичных, реликтовых, редких, исчезающих видов и занесенных в Красную книгу Узбекистана, сородичей культурных растений.

Особенностью настоящего исследования была обязательная фиксация географических координат встреч редких Краснокнижных видов растений.

Определение флористического состава и территориального распределения растительных ассоциаций сопровождалось визуальными наблюдениями, фотографированием и ведением полевого дневника.

При решении вопросов систематики использованы классические морфолого-географические методы (Попов, 1927), «Иллюстрированный определительвысших растений Каракалпакии и Хорезма» (1983), «Определитель растений Средней Азии» (1993).

Состояние мест обитания растительного покрова фиксировали на фото для сравнения с возможными изменениями данных участках в ходе реализации проекта.

Для проведения полевых работ было использовано специальное оборудование: полевой бинокль, теша, лопата, цифровая фотокамера, справочник определитель, гербарная сетка, картографичексие материалы (топографические каты и распечатка космических снимков программы “Google”, GPS Garmin "ETREX".

Предварительные пункты обследования растительного покрова были определены в наиболее характерных местах его распространения. Поскольку состояние растительного покрова непосредственно связано с существующей и планируемой техногенной

нагрузкой, полевые исследования и были привязаны к проектным зонам деятельности Uz-Kor Gas Chemical.

Указанные пункты после дополнительного уточнения и обработки полученных материалов будут рекомендованы для ботанического мониторинга контрактной территории.

Состояние мест обитания растительного покрова фиксировался на фото для сравнения с возможными изменениями данных участках в ходе реализации проекта.

Предварительные пункты обследования растительного покрова были определены в наиболее характерных местах их обитания особенностью биоты.

Биота растительного покрова непосредственно связаны с существующей и планируемой техногенной нагрузкой и были привязаны в ходе полевого исследования к проектным зонам деятельности КОРГАЗХИМИКАЛ

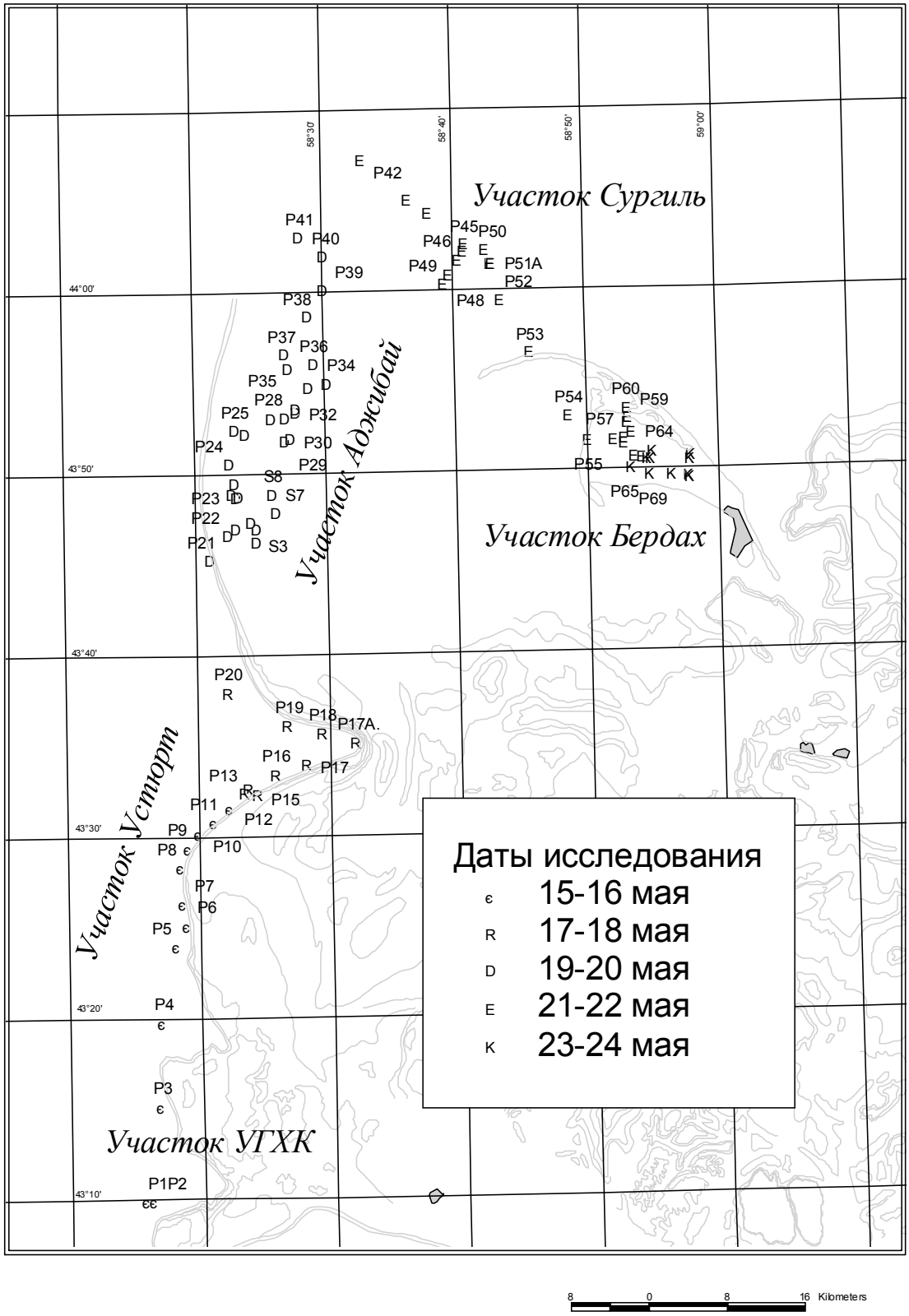

Рисунок 1. Расположение участков работ

Маршрут передвижений

15 май – переезд Нукус – Кунград –Устюрт (УГХК)

15-16 май – обработка участка УГХК

17-18 май – переезд на участок Урга-Тайлы Каратеренг, обработка
19-20 май – переезд на участок Аджибай, обработка
21-22 май – переезд на участок Сургиль, обработка
23-24 май – переезд на участок Восточный Бердах, обработка
25-май возвращение в Нукус

3. РЕЗУЛЬТАТЫ ПОЛЕВЫХ ИССЛЕДОВАНИЙ РАСТИТЕЛЬНОСТИ

3.1 Участок *УГХК.*

В связи с тем, что в зимне-весенний период (2010-2011гг.) в Устюрте выпало очень мало осадков, видовой состав растительности было относительно мало разнообразен. В связи с этим во время полевых работ многие ранее произраставшие виды отсутствовали на данном участке, это в основном касается эфемеров и эфемероидов, а также ряда эндемичных, реликтовых и редких видов.
На территории будущего Устюртского газохимического комплекса помимо ключевого участка были обследованы 11 точек для уточнения ботанического сотава территории и основных растительных сообществ. Видовой состав растений данных точек приведен ниже.

Координаты ключевого участка: N 43.19.799 E 053.17.021
Исследуемый участок представлен засоленной гипсофитной пустыней. Основу растительного покрова составляет биюргуновая формация. Растительность представлена типичными гипсофильными видами. Здесь помимо биюргуна присутствуют несколько видов солянок и эфемеров и эфемероидов. Из полукустарников следует отметить *Artemisia terae-albae, Salsola orientalis,* а из кустарников *Salsola arbuscula*, *Atraphaxis spinosa* виды рода *Calligonum*. Вьюнок цветет, кандым Calligonum плодоносит. Из травянистых растений встречаются *Convolvulus hamada, Limonium otolepsis, Suaeda salsa*, *Atriplex cana*. В общей эволюции экосистем Устюрта биюргунники- *Anabasis salsa* – носители пустынных тенденций развития. Структура сообщества очень мозаична. Большинство исследователей отмечает, что широкое распространение биюргунников, их распознаваемость при наземных исследованиях придает им большое значение важных индикаторов почвенных условий. Местность ровная, серо-бурая такырная почва.

Точка 1. Координаты. N 43.09.916 E 053.15.574
В ключевом участке растительность представлена кейреуково-биюргуновой ассоциацией. Видовой состав сообщества представлен следующими видами: *Salsola arbuscula L*, *Anabasis salsa*, *Convolvulus hamadae.* Местность ровная, серо-бурая такырная почва.

Точка 2. Координаты. N43.09.910 E 058.16.182
Растительность разреженная. По окраинам встречаются отдельные кусты саксаула- *Haloxylon persicum* и вьюнок песчаный *Convolvulus hamadae*. Местность ровная, такырная почва. Отмечены заброшенные норы мелких млекопитающих

Точка 3. Координаты. N 43.15.125 E 053.16.817

В составе биюргуново-саксауловой ассоциаций зарегистрированы следующие виды растений: *Tamarix hispida*, *Haloxylon persicum*, *Salsola arbuscula*, *Anabasis salsa*,

Convolvulus hamadae, *Climacopera aralensis*, *Chenopodium alba.* Неровный микрорельеф, местами сопки, серо-бурая такырная почва (Рис.2).

Рис.1. Лебеда – Atriplex cana

Рис.2. Общий вид участка

Точка 4. Координаты. N 43.24.005, E 058.18.189.
Здесь отмечена биюргуновая ассоциация. В составе данной ассоциации встречаются: из кустарников -кейреук -*Salsola orientalis*, боялыш *Salsola arbuscula*, из полукустарников- буюргун- *Anabasis salsa*, тасбюргун -*Anabasis brachiata*, полынь белоземельная- *Artemisia terrae-albae*, кермек полукустарниковый -*Limonium suffrutcosum* и из многолетников отдельные кусты гармалы обыкновенный- *Peganium harmala*. Неровный микрорельеф, такырная почва.

Точка 5. Координаты.N 48.25.101, E 058.18.935
Ботанический состав данного участка относительно богат. Здесь нами отмечена разноторавно- биюргуновая ассоциация. В составе этой ассоциации были зарегистрированы следующие виды: кустарники - кандым низкий- *Calligonum humile* , курчавка - *Atraphaxis spinosa*; полукустарники -полынь белоземельная -*Artemisia terrae-albae*, кейреук –*Salsola orientalis*, буюргун -*Anabasis salsa*; многолетние - цельнолистник ветвистый - Haplophyllum ramosissmum, климакоптера аральская -*Climacoptera aralensis*, астрагал мохнатолистный- *Astragalus lasiophyllus,* астрагал горький - *Astragalus amarus*, мортук восточный -*Eremopyrum orientalis*, ферула вонючая- *Ferula assa-foetida* высохшая. Неровный микрорельеф, почва с ракушками.

Точка 6. Координаты.N 43.26.333, E 059.18.695.
На описываемой территории отмечены следующие виды: кустарники- дереза русская *Lucium ruthenicum*, кандым низкий- *Calligonum humile,* вьюнок кустарниковый- *Convolvulus fruticosus* (рис.3), тасбюргун -*Anabasis brachiata*; полукустарники - полынь белоземельная- *Artemisia terrae-albae*, кейреук- *Salsola orientalis;* многолетники- парнолистник яйцевидный -*Zygophyillum ovirgerum*, парнолистник туркменский - *Zygophyillum turkomanicum,* янтак -*Alhagi pseudalhagi*, кермек ушколистый- *Limonium otolepis*, прибрежница солончаковая -*Aeluropus litoralis*, спаржа Бреслера –*Asparagus bresieranus*. Местность не ровная, бугры, большинство видов отмечено в оврагах.

Рис.3 Вьюнок кустарниковый- Convolvulus fruticosus

Точка 7. Координаты.N 43.28.339, E 058.18.571.
Данная точка расположена на востоке от оз. Судочье. Растительность разреженная. Проективное покрытие не превышает 60-70%. Но большинство эфемероидов высохшие. Зарегистрированы следующие виды: ринопеталум карелина- Rhinopetalum karelinii, молочай -*Tithymymalus densus*, мортук восточный -*Eremopyrum orientalis* (рис 4), дереза русская- *Lucium ruthenicum,* тасбюргун -*Anabasis brachiata*. Местность ровная. Песчаная почва.

Точка 8. Координаты.N 43.29.422, E 058.19.173
Ботанический состав описываемой площадки разрежненый. Отмечена буюргуново-кейреуковая ассоциация. Основу ассоциаций составляет биюргун *Anabasis salsa* и полынь белоземельная - *Artemisia terrae-albae*. Местами встречается высохшие экземпляры Ринопеталум карелина- *Rhinopetalum karelinii*. Местность ровная, супесчаная почва.

Рис.4. *Eremopyrum orientalis*

Точка 9. Координаты.N 43.30.200, E 058.19.962

В растительном покрове преобладает биюргун - *Anabasis salsa*.Здесь кроме биюргуна встречаются: кустарники- курчавка -*Atraphaxis spinosa*, полукустарники- кейреук- *Salsola orientalis*, из многолетников - астрагал -*Astragalus ammophilus*, тасбюргун- *Anabasis brachiata*, парнолистник яйцевидный -Z*ygophyillum ovirgerum*, парнолистник туркменский- Z*ygophyillum turkomaicum*. Рельеф ровный. Почва –такырная.

Точка 10. Координаты.N 43.30.825, E 058.21.160
Растительность разреженная. Проективное покрытие 50-60%. Основу травостоя составляют рогач- *Ceratocarpus utriculosus и* курчавка- *Atraphaxis spinosa*. Кроме

вышеуказанных видов отмечены вьюнок песчаный- *Convolvulus hamadae*, тасбюргун- *Anabasis brachiata*, лук песчаный -*Allium sabulosum*. По окраинам встречаются отдельные кусты саксаула- *Haloxylon persicum.* Рельеф ровный, почва такырная.

Точка11. Координаты.N 43.31.560, E 058.22.333.
Кустарниково-полынная ассоциация. Произрастают следующие виды: дерево -саксаул *Haloxylon persicum*; полукустарники- кейреук *Salsola orientalis,* многолетние травы- зозима полыннолистная- *Zosimia orientalis*, вьюнок песчаный -*Convolvulus hamadae,* высохший шумания Карелина- Schumannia karelinii, высохший ринопеталум карелина- *Rhinopetalum karelinii*, мортук восточный- *Eremopurum orientalis*, астрагал мохнатолистный- *Astragalus lasiophyllus,* астрагал горький - *Astragalus amarus*, климакоптера аральская -*Climacoptera aralensis*. Местность ровная, почва такырная.

Устюрт (Акушпа, Тайлы, Урга)
Координаты ключевого участка. N 43.32.333, E 058.24.419.
Основу растительного покрова составляет биюргуново- кустарниковая ассоциация (рис.5). В составе сообществ произрастают следующие виды растений: хвойник двухколосковая- *Ephedra distachya*, полынь белой земли -*Artemisia terrae –albae*, рогач -*Ceratocarpus utriculosus*, дереза русская -*Lycium ruthenicum*, вьюнок- *Convolvulus hamadae*, янтак -*Alhagi pseudalgahi*, цельнолистник ветвистый -*Haplophillum ramosissimum*, тасбюргун- *Anabasis brachiata*, лук -*Allium sabulosum*, шумания Карелина -*Schumannia karelinii*, аристида мелкоперистая -*Aristida pennata*, мортук восточный *Eremopyrum orientalis*, солянка хивинская -*Salsola chiviensis*. Характерной чертой этой ассоциации является участие в ней краснокнижного вида солянки хивинской -*Salsola chiviensis.* Неровный микрорельеф. Почва - щебнистый такыр.

Рис. 5. Плато Устюрт, биюргунники

Точка 1. Координаты: N 43° 30′ 35.4, E 58° 20′ 29,0

Разнотравно- полынная ассоциация. Этот ключевой участок заложен на разнотравно-белоземельном полынниках. Рельеф неровный, почва супесчаная. Растительность представлена гипсофильными и псаммофильными видами. В отличие от предыдущих точек на описываемой территории эфемеры и эфемероиды встречаются часто. В ключевом участке отмечена злаково-полынная ассоциация. Здесь присутствуют полынь белоземельная- *Artemisia terrae-albae*, прибрежница солончаковая- *Aeluropus litoralis*, рогач- *Ceratocarpus utriculosus,* климакоптера аральская -*Climacoptera aralensis*, лебеда- *Atriplex cana,* марь белая -Chenopodium albium, а также янтак- Alhagi pseudalhagi. Почва серо-бурая, такырная, встречаются ямы с выходами белого гипса (рис. 6).

Точка 2. Координаты: N 43.32.403, E 058.23.407.

Растительность разреженная. Проективное покрытие 50-60%. Зарегистрирована кейреуковая ассоциация с участием полукустарников. Основу травостоя составляет кейреук -*Salsola orientalis*, субдоминантами является полынь белоземельная- *Artemisia terrae –albae.* Местами распространены тасбюргун -*Anabasis brachiata* и парнолистник яйцевидный -Z*ygophyillum ovirgerum*. Под кустами полукустарников сохранились сухие особи прошлогодних травянистых растений. Рельеф ровный, почва такырная.

Рис. 6. Разнотравно-полынная ассоциация

Точка 3. Координаты:N 43.32.676, E 058.23.792.

Разнотравно-кейреуковая ассоциация по условиям рельефа мало отличается от предыдущих. В первом ярусе ассоциаций отмечены боялыш -*Salsola arbuscula,* полынь белой земли *Artemisia*, кейрук Salsola rigida и вьюнок песчаный *Convolvulus hamada*, во втором ярусе - бюргун Anabasis salsa , тасбюргун *Anabasis brachiata*, цельнолистник ветвистый *Haplophillum ramosissimum*, астрагал мохнатолистный -*Astragalus lasiophyllus*,

астрагал горький - *Astragalus amarus*. В третьем ярусе значительное место принадлежит мортуку- *Eremopurum orientalis*.

Точка 4. Координаты: N 43° 33′ 34.5, E 58° 27′ 28.4
Биюргуново- кейреуковая ассоциация. Данная ассоциация занимает огромные площади на солончаковых почвах Устюрта. Описываемый участок заложен на восточном чинке. Проективное покрытие ассоциации составляет 70-75%, основу которого составляет кейреук. Ботанический состав ассоциаций состоит из следующих видов. Кустарники-боялыш Salsola arbuscula, полукустарники -кейреук -Salsola orientalis, биюргун -Anabasis salsa, травянистые растения - бассия - Bassia hyssopifolia, рогач- *Ceratocarpus utriculosus* сведа -Suaeda salsa, марь белая- Chenopodium alba. Также здесь отмечены высохшие эфемеры (мортук восточный -Eremopurum orientalis, лук песчаный -Allium sabulosum). Почва серо-бурая.

Точка 5. Координаты: N 43.33.391, E 058.25.825. Этот ключевой участок заложен на разнотравно-кустарниковом сообществе. В первом ярусе отмечены дереза русская- *Lycium ruthenicum*, боялыш -*Salsola arbuscula,* вьюнок песчаный -*Convolvulus hamadae*, во втором ярусе –биюргун- *Anabasis salsa*, астрагал мохнатолистный- *Astragalus lasiophyllus,* солянка хивинская- *Salsola chiviensis*, цельнолистник ветвистый -*Haplophillum ramosissimum*, полынь белоземельная- *Artemisia terrae-albae*. Нижный ярус представлен небольшими количествами мортука - *Eremopurum orientalis.* Рельеф неровный, почва такырная.

Точка 6. Координаты: N 43.33.954, E 058.28.197.
Неровный микрорельеф. Восточная экспозиция. Растительность относительно богатая по сравнению с предыдущими точками. Здесь зарегистрировано разнотравно-эфедровые сообщества. В составе сообществ произрастают следующие виды: ломонос восточный - Clematis orientalis (рис. 7), кейреук -*Salsola orientalis*, полынь туранская- *Artemisia turanica*, эфедра двухколосковая -*Ephedra distachya*, зозима полыннолистная- *Zosima orientalis,* шумания Карелина -Schumannia karelinii, дереза русская -*Lycium ruthenicum*, янтак *Alhagi pseudalgahi*, прибрежница солнчаковая -*Aeluropus litoralis*, вьюнок песчаный *Convolvulus hamadae,* рогач- *Ceratocarpus utriculosus*, аристида мелкоперистая -*Aristida pennata*, цельнолистник ветвистый -*Haplophillum ramosissimum*, житняк сибирский - Agropyron sibiricum. Рельеф неровный, почва каменисто-песчаная.

Точка 7. Координаты: N 43.35.100, E 058.31.938.
Почва описываемой территории такырная. Неровный микрорельеф. Растительный покров состоит из биюргуновой формации, биюргуновой ассоциации. Годичные зеленные веточки биюргуна составляют 10-15% от общей надземной фитомассы. В естессвенных условиях биюргун имеет две экорасы: гипсофильная и галофильная. На описываемой площадке распространена гипсофитная экораса биюргуна. В составе сообщества были зарегистрированы следующие виды: лук песчаный- *Allium sabulosum* (рис. 8), курчавка колючая- *Atraphaxis spinosa*, вьюнок песчаный -*Convolvulus hamadae*, тасбюргун -*Anabasis brachiata*, шумания Карелина- *Schumannia karelinii*, парнолистник яйцевидный - *Zygophyillum ovirgerum*, дереза русская -*Lycium ruthenicum*.

Рис. 7. Clematis orientalis

Рис. 8 *Allium sabulosum*

Точка 8. Координаты: N 43.35.633, E 058.29.432
Гипсоносная почва. Неровный микрорельеф. Эдификатором растительного покрова данной точки является полыньбелоземельная - *Artemisia terrae- albae.* Ассоциация полынь белоземельной широко распространена на плато Устюрт. Заросли белоземельной полыни на Устюрте формируются в едва заметных понижениях, предварительно мелиорированных несколько большим увлажнением за счет поверхностного стока атмосферных осадков. Обычно по ботаническому составу ассоциация полыни белоземельной богаче по сравнению с биюргуном и боялышем. Но из-за неблагоприятной погодной обстановки в этом году в составе этой ассоциации отмечены всего несколько видов – боялыш- *Salsola arbuscula*, кейреук *Salsola orientalis,* рогач- *Ceratocarpus utriculosus,*- мортук восточный - *Eremopyrum orientalis.*

Точка 9. Координаты: N 43.36.097, E 058.26.821.
Почва описываемой точки –такырная. Микрорельеф неровный. Здесь отмечена полынно-биюргуново-саксауловая ассоциация. Проективное покрытие 50-60%. Доминирует белый саксаул. В составе данной ассоциации происрастали следующие виды: -саксаул *Halohylon persicum*, буюргун -*Anabasis salsa*, тасбюргун -*Anabasis brachiata* (рис. 9), полынь белоземельная - *Artemisia terrae- albae*, рогач -*Ceratocarpus utriculosus*, вьюнок-*Convolvulus hamadae*, мортук восточный -*Eremopurum orientalis*, кейреук -*Salsola orientalis*, астрагал мохнатолистный- *Astragalus lasiophyllus*.

Рис. 9. *Anabasis brachiata*

Точка 10. Координаты: N 43.37.947, E 058.22.251.
Точка мониторингового исследования заложена на полыновой ассоциации. Почва исследуемого участка серо-бурая. В составе данной ассоциации отмечены 7 видов сосудистых растений - полынь белоземельная- *Artemisia terrae- albae*, ковыль -*Stipa richteriana*, мортук восточный -*Eremopurum orientalis*, астрагал мохнатолистный-

Astragalus lasiophyllus, буюргун- *Anabasis salsa*, боялыш -*Salsola rigida*, курчавка- *Atraphaxis spinosa*.

Участок Аджибайский

Экологические условия на Аджибайском участке разнообразны. Здесь встречаются пухлые солончаки, солонцеватые почвы, слабо засоленные серо-бурые почвы и местами болота. Соответственно, встречаются различные экологические группы растений в зависимости от природно-территориального комплекса. В связи с этим, нами были выделены 2 ключевых участка.

Координаты 1 ключевого участка: N 43.53.061. E 058.27.033.
Почва засоленная. В растительном покрове преобладают галофиты. Здесь нами выделена гребенщиково- карабараковая ассоциация. Проективное покрытие 80%, основу травостоя составляют виды гребенщика (*Tamarix hispida, Tamarix* l*axa,Tamarix pentandra).* Кроме гребенщиков местами тростник южный -*Phragmites australis* и соляноколосник каспийский -*Halostachys caspica* образует небольшие заросли. Кроме того, на этой точке развиты пухлые солончаки, где проективное покрытие составляет 0%.

Координаты 2 ключевого участка: N 43.50.536, E 058.22.648.

Почва супесчаная, засоленная. Эдификатором растительного покрова является белый саксаул- *Halohylon persicum*. Проективное покрытие -70-80%.

На Аджибайском участке были обследованы всего 18 точек. Растительность во многих точках однародная. Если в 1, 3, 4, 5 ,6 и 7 доминирует саксаул белый, то в остальных точках эдификаторами растительного покрова являются виды рода *Tamarix* (рис. 10) и в отдельных случаях преобладает солянколосник каспийский *Halostachys caspica* (табл. 1.)

Табл. 1.

Список растений Аджибайского участка

Номер точек	Координаты	Названия растений	Примечание
1	N 43.45.279, E 058.21.037	*Haloxylon persicum* *Eremopurum orientalis* *Salsola orientalis*	Проективное покрытие 30-40%. Доминирует белый саксаул
2	N 43.46.583, E 058.22.467	*Tamarix hispida* *Nitraria sibirica* *Lucium ruthenicum*	Проективное покрытие 50-60%. Эдификатором является гребенщик
3	N 43.48.896, E 058.22.822	*Halohylon persicum* *Eremopurum orientalis*	Отмечены молодые всходы саксаула белого
4	N 43.50.536. E 058.22.648	*Haloxylon persicum* *Climacoptera aralensis*	Саксаул образует густой лес. Проективное покрытие 80%.
5	N 43.52.411. E 058.23.148	*Haloxylon persicum* *Suaeda salsa*	Проективное покрытие 40-50%.
6	N 43.52.157. E 058.23.907	*Haloxylon persicum*	Посеян саксаул. Отмечено естественное возобновление
7	N 43.52.976. E 058.25.905	*Haloxylon persicum*	Солончаковая пустошь. Проективное покрытие 5-7%.

8	N 43.51.752 E 058.26.927	*Tamarix hispida* *Halostachys caspica*	Проективное покрытие 30-40%.
9	N 43.51.890. E 058.27.356	*Tamarix hispida* *Halostachys caspica*	Проективное покрытие 30-40%
10	N 43.53.301. E 058.27.768	*Tamarix hispida* *Phragmites australis*.	Проективное покрытие 40-50%. Доминирует гребенщик.
11	N 43.53.554. E 058.27.826	*Halostachys caspica* *Tamarix hispida*.	За счет густого зарастания *Halostachys caspica* проективное покрытие достигает 70-80%.
12	N 43.54.652 E 058.28.845	*Tamarix hispida* *Halostachys caspica* *Phragmites australis*	Отмечены заросли гребенщика. Проективное покрытие 80-90%.
13	N 43.54.923. E 058.30.208	*Phragmites australis* *Aeluropis litoralis*	Затопленная водой точка.
14	N 43.55.778. E 058.27.285	*Tamarix hispida* *Tamarix laxa* *Tamarix pentandra* *Suaeda salsa*	Проективное покрытие 60%. Эдификатором является *Tamarix pentandra*
15	43.56.013. 058.29.258	*Tamarix hispida* *Tamarix laxa* *Halostachys caspica*	Проективное покрытие 50-60%. Доминирует *Tamarix hispida*
16	43.56.541. 058.27.002	*Tamarix laxa* *Tamarix pentandra* *Tamarix hispida* *Halostachys caspica*	Проективное покрытие 70%. Доминирует *Tamarix hispida*
17	N 43.58.659. E 058.28.817	*Tamarix hispida* *Tamarix laxa* *Halostachys caspica* *Suaeda salsa* *Climacopera aralensis*	Смешано-кустарниковая ассоциация. Проективное покрытие не превышает 70%.
18	N. 44.00.128. E. 058.30.043	*Halostachys caspica*	Отмечены фитогенные бугры, заросшие *Halostachys caspica*

Рис.10 Гребенщиковые заросли

Участок Сургиль

Координаты ключевого участка: N 44.02.190, E 058.40.806

Рельеф описываемой территории ровный. Почвы засоленные, серо-бурые. Местами встречаются небольшие песчаные массивы. Отмечены фитогенные бугры. Растительность разреженная. На соланчаках белый саксаул образует небольшие группировки. На песках распространены виды рода кандыма (*Calligonum aralense, Calligonum obtusum).* В отдельных местах встречаются кусты гребенщиков *Tamarix hispida, Tamarix laxa* – редко. На восточной части дороги встречаются отдельные фитогенные бугры, которые состоят из гребенщика *Tamarix hispida* (рис. 11). В понижениях произрастают однолетние растения- марь белая- Chenopodium album, лебеда -Atriplex cana. По разнообразию растительного мира данный участок сильно не отличается от предыдущего. Основу растительного покрова составляют саксаул белый, виды рода тамарикс.

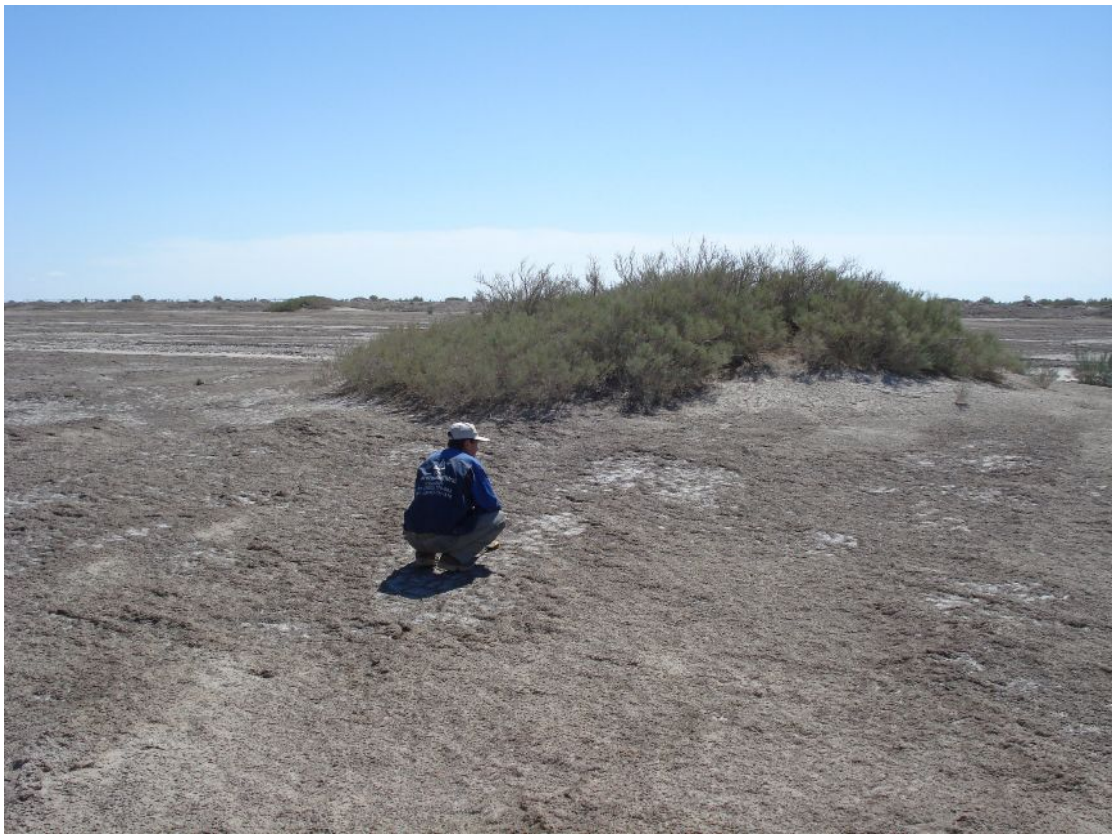

Рис.11. ***Tamarix hispida***

Точка 1. Координаты: N 44.01.672, E 058.40.366

Почва описываемого участка – супесчаная, засоленная. В растительном покрове преобладают виды рода *Calligonum(C. aralense, C. obtusum)*. Под кустамы старых особей кандыма было отмечено естественное возобновление. Вдоль дороги *м*естами встречаются молодые особи белого саксаула. На понижениях лебеда- *Atriplex cana* образует густой покров. Проективное покрытие почв 60-70%.

Точка 2. Координаты: N 44.03.087. E 058.28.272

Исследуемая точка была заложена не далеко от скважины Камка. Почва обследуемой территории – серо-бурая, засоленная. Растительность разрежанная. Проективное покрытие не превышает 40%. Эдификатором растительного покрова является солянколосник каспийский- *Halostachys caspica* (рис. 12). Местами встречаются небольшие кусты гребенщика - *Tamarix hispida, Tamarix laxa*.

Рис. 12. Halostachys caspica

По ботаническому составу *точки 3 (N 44.07.279, E 058.33.134), 4 (N 44.05.031, E 058.36.603) и 5 (N 44.04.263, E 058.38.192)* сильно не отличаются, так как во всех точках господствует солончак. Эдификаторами исследуемой территории являются виды гребенщика -*Tamarix laxa, Tamarix pentandra*, *Tamarix hispida*. В более пониженных местах, где соленость почвы высокая, солянколосник каспийский -*Halostachys caspica* образует небольшие группировки. Проективное покрытие в третьей точке- 40-50%, в четвертой и пятой 60-70%. На всех участках травянистые растения отсувтствуют.

Точка 6. Координаты N 44.02.535, E 058.40.927

Техногенный ландшафт местами разрытый. Почва серо-бурая. Здесь нами выделена разнотравно- кандымовая ассоциация. Доминантами сообщества являются виды рода кандым (*Calligonum densum, Calligonum obtusum)*. В составе данной ассоциации были зарегистрированы следующие виды: травянистые растения- марь белая- Chenopodium album, лебеда -Atriplex cana, тросник южный - *Phragmites australis;* кустарники гребенщики- *Tamarix hispida*, *Tamarix laxa, Tamarix pentandra*.

Точка 7. Координаты: N 44.02.190, E 058.40.806/

Почва серо-бурая, засоленная. Местами встречаются небольшие песчаные участки, а также фитогенные бугорки. Растительный покров состоит из смешено-кустарников, где эдификатором является *Haloxylon persicum,* а субэдификатором- *Tamarix hispida.* Встречаемость *Tamarix laxa* – непосредственная. Кроме выщеуказанных видов на песках встречаются *Calligonum aralense, Calligonum obtusum,* которые имеют естественное возобновление.

Рис.13. *Calligonum aralense, C. obtusum*

Точка 8. Координаты: N 44.01.672, E 058.40.366

Мониторинговая точка была заложена на кандымовой формации. В растительном покрове пустынь джузгунники (*Calligonum*) наряду с белосаксаульниками занимают заметное место (рис. 13), создавая один из наиболее широко распространенных ландшафтов песчаных пустынь. Джузгунники обычно на вторичных местообитаниях выступают в качестве эдификаторов, как это наблюдается в данной точке. Ботанический состав беден, но проективное покрытие относительно высокое-80% (за счет кустарников). На этой точке были отмечены: *Calligonum aralense, Calligonum obtusum, Calligonum densum*, *Haloxylon persicum, Atriplex cana*. Все виды кандыма находятся в фазе плодоношения.

Точка 9. Координаты: N 44.00.796, E 058.39.669

Почва описываемой точки –песчаная. Как известно песчаная почва имеет благоприятный водный режим для роста и развития травянистых растений. В связи с этим, впервые в течение экспедиции нами отмечены лебедовая ассоциация, где доминирует однолетняя трава - Atriplex cana. В составе данной ассоциации кроме лебеды встречаются такие травянистые растения, как сведа- Suaeda salsa, климакоптеры -*Climacoptera aralensis*, *Climacopera arcuata*, марь сизая - *Chenopodium glaucum*. Местами встречаются отдельные кусты саксаула - *Haloxylon persicum.*

Точка 10. Координаты: N44.00.331 E 058.39.259

Структура растительного покрова данной точки очень близко к точке 8. Этот ключовой участок заложен в кандымовом сообществе. Проективное покрытие почвы 60-70%. В составе сообщества встречаются кандымы -*Calligonum aralense, Calligonum obtusum, Calligonum densum*, местами лебеда- *Atriplex cana*. Почва супесчаная, засоленная. Рельеф ровный.

Точка 11. Координаты: N 44.02.208, E 058.42.463
Рельеф описываемой точки ровный. Почва – песчаная с ракушками. Здесь нами выделена кандымово-астрагаловая ассоциация. Основу растительного покрова составляют виды кандыма и астрагала песчаного. Проективное покрытие 80%. Ботанический состав ассоциаций состоит из следующих видов: *Calligonum aralense, Calligonum densum*, *Astragalus ammodendron* (рис. 14), *Phragmites australis, Cornulaca korshinskyi*, *Alhagi pseudalhagi*, *Karelinia caspia*. Встречаются высохшие эфемеры прошлого года. Зарегистрированы многочисленные всходы астрагала - *Astragalus ammodendron.*

Рис.14 Astragalus ammodendron

Точка 12. Координаты: N 44.01.426, E 058.42.880; Точка 13. Координаты N 44.01.416 E 058.42.928.
Эти ключевые участки были заложены рядом, вдоль двух сторон дорог в саксауловом культурфитоценозе (рис. 15). Отмечен семенной посев белого саксаула - *Halohylon persicum* на площади 30 га. *Под саксаулами встречаются Eremopyrum orientalis, Poa bulbosa, Climacoptera aralensis, C. lanata, Senecio subdentatus*. Проективное покрытие 40-50%.

Рис. 15 Саксауловые заросли

Точка 14. Координаты: N 43.59.409, E 058.43.559

Мониторинговая участка была заложена возле СКВ. Почва песчаная. Растительность разреженная, состоит из солянок и кустарников. Проективное покрытие невысокое 40%. Ботанический состав состоит из следующих видов: саксаул -*Haloxylon persicum*, климокаптера аральская- *Climacoptera aralensis*, солянка Паульсена - *Salsola paulseni,i* отдельные кусты кандымов *Calligonum aralense, Calligonum obtusum.*

Точка 15. Координаты: N 43.56.480, E 058.45.745
Рельеф описываемого участка – бугристые пески. Здесь нами выделена разнотравно-кандымовая ассоциация. Основу сообщества составляют виды кандыма. Эдификатором является *Calligonum aralense.* В составе данной ассоциации отмечены*:* кандымы-*Calligonum aralense, Calligonum obtusum, Calligonum densum*, астрагал -*Astragalus ammodendron*, мортук восточный -*Eremopyrum orientalis*, солянка Паульсена - *Salsola Paulsenii*, ковыль прекрасный -*Stipa bella*. Высохшие экземпляры корнуляка Коржинского-*Cornulaca korshinskyi*.

Точка 16. Координаты: N 43.52.943, E 058.48.662
Растительность разреженная. Проективное покрытие не высокое – 40%. Доминантом растительного покрова является *Calligonum aralense* . Ботанический состав описываемой территории бедный и состоит всего из трех видов сосудистых растений – кандыма аральского - *Calligonum aralense,* тростника южного- *Phragmites australis* и климакоптера аральская -*Climacopera aralensis*. Местность равная. Почва песчаная с ракушками.

Восточный Бердах.

Координаты ключевого участка: N 43.51.607, E 058.50.053
Ключовой участок был заложен в западной части острова Токмаката.
Растительность представляет собой разноторавно- кустарниковых ассоциаций. Здесь наряду кустарниковых растений часто встречаются травянистые растения. В составе ассоциации произрастают следующие виды: песчаная акация -*Ammodendron conollyi*, янтак- *Alhagi pseudalgahi*, песчаная акация серебристая -*Ammodendron argenteum*, рогач - *Ceratocarpus utriculosus*, солянка Паульсена -*Salsola Paulsenii,* гармала обыкновенная - *Peganum harmala*, астрагал- *Astragalus ammodendron*, высохший полынь белой земли - *Artemisia terrae-albae*. песчаной вьюнок -*Convolvulus hamadae*, сведа -*Suaeda salsa*, мортук восточный -*Eremopyrum orientalis*, гелиотроп волосистоплодный- *Heliotropium dasycarpum.* Местность возвышенная, почва – песчаная.

Точка 1. Координаты: N 43.51.382, E 058.52.865
Рельеф описываемого участка ровный. Почва песчаная с ракушками. Здесь нами отмечена разнотравно-кустарниковая ассоциация. Эдификатором сообщества является *Haloxylon persicum.* Ботанический состав: осока вздутая -*Carex physodes*, боялыш -*Salsola arbuscula,* песчанная акация -*Ammodendron conollyi*, песчаная акация серебристая -*Ammodendron argenteum* (рис. 16), мортук восточный -*Eremopurum orientalis*, янтак -*Alhagi pseudalgahi*, кейреук *Salsola orientalis*, крестовник -*Senecio subdentatus*, лук песчаный- *Allium sabulosum*, высохший полынь -*Artemisia terrae- albae*.

Рис. 16 Ammodendron argenteum

Точка 2. Координаты: N 43.51.700, E 058.52.875
На обследуемой территории пустыная осочка доминирует. Несмотря на особую роль, которое играет пустыная осочка в жизни растительных сообществ песчаных пустын Турана лишь немногие выделяют илакувую фармация. Осока вздутая – Carex physodes

псаммофильный корневищный эфемероид, 15-25 см высоты. Является прикрасным кормовым растением. В составе этой ассоциаций встречаются: *Ammodendron conollyi*, саксаул -*Haloxylon persicum*, гребенщик - *Tamarix laxa*, *Tamarix hispida*, кандым - *Calligonum obtusum, Calligonum densum*, полынь белой земли- *Artemisia terrae-albae*, солянка паульсена - *Salsola Paulsenii*, астрагал -*Astragalus ammodendron*, песчаная акация *Ammodendron conollyi*, эфедра двухколосковая -*Ephedra distachya*, рогач -*Ceratocarpus utriculosus*, янтак - *Alhagi pseudalgahi*, лук песчаный -*Allium sabilosum*, вьюнок песчаный- *Convolvulus hamadae*, мортук восточный - *Eremopyrum orientalis*, крестовник - *Senecio subdentatus,* кейреук -*Salsola orientalis.* Неровный микрорельеф. Почва песчано-суглинистый. Встречается многочисленные норы мелких млекопитающих.

Точка 3. Координаты: N 43.52.566, E 058.53.071

Растительность обследуемого участка разреженная. Отмечено всего 2 вида. На понижениях распространен поташник- *Kalidium foliatum*. На повышенных местах встречается песчаная акация Конолли -*Ammodendron conollyi*. Местность неравная, почва песчаная, засоленная.

Точка 4. Координаты: N 43.52.787, E 058.53.150

На обследуемой территории господствуют кустарниовая растительность. Именно здесь представлены многие индекаторы песчаной пустыни. Проетивное покрытие 70-80%. На этой точке нами отмечена песчаноакациево- кандымовая ассоциация. Ботанический состав состоит из следующих видов: песчаная акация Конолли- *Ammodendron conollyi*, песчаная акация серебристая- *Ammodendron argenteum*, боялыш -*Salsola arbuscula*, кандым - *Calligonum aralense, Calligonum obtusum, Calligonum densum*, астрагал -*Astragalus ammodendron*, эфедра двухколосковая -*Ephedra distachya,* эфедра хвощевая -*Ephedra equisetina*, вьюнок песчаный- *Convolvulus hamadae*, мортук восточный -*Eremopurum orientalis*, осока вздутая- *Carex physodes*, крестовник - *Senecio subdentatus.*
Неровный микрорельеф. Почва песчаная.

Точка 5. Координаты: N 43.53.342, E 058.53.091

На данной точке отмечен небольшие заросли белого саксаула. Другие виды отсувствуют. Под куронами саксаула встречаются остатки прошлогодных высохших эфемеров и эфемероидов. Встречается также пустошь более 4-5 га. Местность не равная, почва такырная. Наблюдался песчаная буря.

Точка 6. Координаты: N 43.51.628, E 058.52.072

Неровный микрорельеф. Почва песчаная. Опысиваемой территории широко распространены эдификаторы песчаных пустын. Здесь как и 4 точке выделена песчаноакациево- кандымовая ассоциация. Ботанический состав ассоциации состоит из следующих видов: кандымы- *Calligonum aralense, Calligonum obtusum, Calligonum densum*, песчанная акация Конолли -*Ammodendron conollyi*, песчанная акация серебристая - *Ammodendron argenteum,* янтак - *Alhagi pseudalgahi*, лук песчаный - *Allium sabilosum Stev*, вьюнок песчаный - *Convolvulus hamadae*, осока вздутая - *Carex physodes*, крестовник - *Senecio subdentatus*, шумания карелинская -*Schumannia karelinii*, полынь белоземельная- *Artemisia terrae-albae*.

Местность неравная. Почва песчаная. Встречается многочисленные норы мелких млекопитающих.

Точка 7. Координаты N 43.50.665, E 058.53.664

Неровный микрорельеф. Песчаная почва. Здесь нами была выделена разнотравно-саксауловая ассоциация. Проективное покрытие почвы 50-60%. Имеется молодые особи белого саксаула. В составе данной ассоциаций встречаются: саксаул- *Haloxylon persicum*, рогач -*Ceratocarpus utriculosus*, осока вздутая -*Carex physodes*, лук песчаный -*Allium sabilosum*, полынь белоземельная -*Artemisia terrae-albae*, гармала обыкновенная -*Peganum harmala*, крестовник -*Senecio subdentatus.*

Точка 8. Координаты: N 43.50.578, E 058.54.192

Растительность разреженная. Доминантами является белый саксаул. Характерной чертой данного сообщества является равномерной распространения осочки вздутой. Здесь нами отмечено полынно-саксауловая ассоциация. Ботанический состав: саксаул -*Haloxylon persicum*, кандым -*Calligonum aralense, Calligonum obtusum, Calligonum densum,* гармала обыкновенная -*Peganum harmala*, полынь белой земли *Artemisia terrae-albae*, осока вздутая -*Carex physodes,* мортук восточный -*Eremopurum orientalis*.
Местность не равная, почва песчаная.

Точка 9. Координаты: N 43.51.924, E 058.53.464
Неровный рельеф, бугристые пески. Как обычно в таких условиях в растительном покрове доминируют виды рода кандыма. Здесь нами описана разнотравно-кандымовая ассоциация. В составе сообщества произрастают следующие виды: кандымы- *Calligonum aralense, Calligonum obtusum*, песчанная акация Конолли -*Ammodendron conollyi*, песчаная акация серебристая -*Ammodendron argenteum*, боялыш -*Salsola arbuscula,* эфедра- *Ephedra distachya*, полынь белоземельная- *Artemisia terrae-albae*, осока вздутая -*Carex physodes*, янтак -*Alhagi pseudalgahi*, ковыль -*Stipa Richteriana*, сведа- *Suaeda salsa*.
Встречается норы мелких млекопитающих и много птиц.

Точка 10. Координаты: N 43.50.055, E 058.53.355
Почва обследуемого участка песчаная. Рельеф неровная. В растительном покрове преобладает полынь белоземельная. Местами на более засоленных участках саксаул образует небольшие заросли. Ботанический состав: саксаул -*Haloxylon persicum,* полынь белоземельная- *Artemisia terrae-albae*, климакоптера аральская *Climacoptera aralensis*, гармала обыкновенная -*Peganum harmala*, кейреук –*Salsola orientalis.*

Точка 11. Координаты: N 43.50.911, E 058.54.961
Приобладают кустарники. Эдификатором сообщества является саксаул белый. Проективное покрытие 70%. В составе данной ассоциации отмечены следующие виды: саксаул -*Haloxylon persicum*, песчанная акация Конолли- *Ammodendron conollyi*, песчаная акация серебристая -*Ammodendron argenteum*, боялыш -*Salsola arbuscula,* эфедра -*Ephedra distachya* (рис. 17), полынь белоземельная- *Artemisia terrae-albae*, кандым- *Calligonum aralense*, осока вздутая -*Carex physodes*, крестовник -*Senecio subdentatus*, мортук восточный- *Eremopurum orientalis*, рогач -*Ceratocarpus utriculosus*, Лук песчаный -*Allium sabilosum.*
Рельеф неровный, песчаные бугры. Встречается норы мелких млекопитающих и много птиц.

Рис. 17 *Ephedra distachya*

Точка 12. Координаты: N 43.50.493, E 058.54.627
Рельеф неровный. Местами своеобразная котловина. Разреженная растительность. В отдельных участках растения не встречаются. Вокруг котловины отмечены полынь раскидыстая - *Artemisiadiffusa*, саксаул- *Halohylon persicum*, осока вздутая - *Carex physodes*, мортук восточный -*Eremopurum orientalis.*

Точка 13. Координаты: N 43.50.525, E 058.54.926; Точка 14. Координаты: N 43.49.622, E 058.54.812

Рельеф описываемых территорий неровный. Доминантом является белый саксаул. В составе сообщества отмечены следующие виды: саксаул- *Haloxylon persicum,* полынь белоземельная- *Artemisia terrae albae*, осока вздутая- *Carex physodes*, мортук восточный - *Eremopurum orientalis*, гармала обыкновенная *Peganum harmala*.

Точка 15. Координаты: N 43.49.612, E 058.56.486
На данном участке нами выделена саксауловая –полынная ассоциация. Отмечены высокорослые саксаулы – до 4 м. Растительность разреженная. В растительном покрове зарегистрированы всего 3 вида: саксаул -*Haloxylon persicum,* полынь белоземельная- *Artemisia terrae-albae*, мортук восточный -*Eremopurum orientalis* .
Неровный микрорельеф. Почва песчаная. Имеется мусоросвалка рыбкомбината г. Муйнака.

Точка 16. Координаты: N 43.49.529, T 058.57.745

Отмечена разнотравно-саксауловая ассоциация, где доминирует белый саксаул. Проективное покрытие 50%. Зарегистрированы следующие виды: саксаул -*Haloxylon persicum,* янтак - *Alhagi pseudalgahi*, солянка Паульсена -*Salsola Paulsenii*, мортук восточный- *Eremopurum orientalis,* полынь белоземельная- *Artemisia terrae-albae*, гармала обыкновенная - *Peganum harmala*. Встречается терметники (рис. 18).

Рис. 18. Терметники

Точка 17. Координаты: N 43.50.459, E 058.57.887

Проективное покрытие на данной участке – 0%. Местами встречаются сухие остатки *Kalidium caspicum.*

Точка 18. Координаты: N 43.50.644, E 058.57.958.
Барханные пески. Доминируют псаммофитные растения. Здесь нами отмечена разнотравно-кустарниковая ассоциация. В составе этой ассоциации зарегистрированы следующие виды: саксаул -*Haloxylon persicum,* боялыш *Salsola arbuscula,* вьюнок песчаный -*Convolvulus hamadae*, шумания карелиния -*Schumannia karelinii*, песчаная акация -*Ammodendron conollyi*, хвойник двухколосковый -*Ephedra distachya*, кандымы- *Calligonum aralense, Calligonum obtusum*, песчанная акация Конолли -*Ammodendron conollyi*, осока вздутая -*Carex physodes*, рогач -*Ceratocarpus utriculosus*, солянка Паульсена- *Salsola Paulsenii*.

Точка 19. Координаты:N 43.49.434, E 058.57.807
Межбарханная котловина. Почва песчаная, засоленная. Разреженная растительность. Отмечена 2 вида гипергалофитов- поташник каспийский- *Kalidium caspicum* и соляноколосник каспийский- *Halostachys caspica*.

Выводы

REPORT OF THE RESULTS OF FLORA SURVEY OF THE SURGIL, NORTHERN AND EASTERN BERDAH FIELDS, USTYURT GAS-CHEMICAL AND RELATED INFRASTRUCTURE

TABLE OF CONTENTS

INTRODUCTION

At the present time, implementation of the Surgil Project had commenced, which included development of gas fields and construction of the Ustyurt Gas Chemical Complex (UGCC) for petrochemical production. Construction and operation of the Project facilities may have a number of positive and negative environmental impacts. Therefore, in the framework of the Environmental and Socioeconomic Impact Assessment (ESIA) for the Surgil Project, the assessment of impact on the components of biologic diversity of the project area is implemented. The purpose of the assessment is to study and minimize adverse impact in the course of the Project implementation on the flora in whole and, inclusively, on endemic and scarce varieties of plants.

The Project provides for development of the three components:

- Drilling of gas wells and construction of related engineering services at the fields of Surgil, Northern and Eastern Berdah to the south of the existing Aral Sea;
- Construction and operation of the Ustyurt Gas Chemical Complex (UGCC) near Kirkkiz/Akcholak settlement on the Ustyurt Plateau, and related infrastructure;
- Construction and operation of underground pipelines for gas and condensate transportation from the fields to the Gas Chemical Complex.

This study is aimed at preparation of overview of the current state of flora of the Project and adjacent area; collection of information of habitats of protected plant varieties.

For achievement of the set tasks, the group of scientists from the Bioecological Institute of Karakalpak Branch of the Academy of Sciences of the Republic of Uzbekistan and the Botanika Scientific-Production Center of the Academy of Sciences of the Republic of Uzbekistan, overview of basic

information for the flora of the Project area and spring field studies have been carried out on the contract area, and resulted in receipt of the information of the vegetative cover, including rare varieties, growing within the Contract area.

1. OVERVIEW OF BASIC DATA OF THE FLORA OF THE CONTRACT AND ADJACENT AREA

Floristic or species diversity and viability determine the image of biological capabilities, eventually, biological productivity of the vegetative cover, degree of sustainability of the whole ecosystem. Fundamental studies of flora diversity allow to identify the flora genesis of ecological features of plants, determine scarce and endangered species, develop scientific basis of their preservation.

Ustyurt abruptly changed under the effect of desertization of the Aral region. The Created extreme conditions led to worsening of the environmental system, that dramatically affected the natural flora.

Springlets and *mozhaichniks* have dried on the eastern cliff of Ustyurt. The results of surveys show that lowering of the Aral Sea level reflected on the vegetation in unequal degree. Severe impact is noticeable in the southern part of foreland in the region of Urga, where sea is practically absent, dried strip of the eastern cliff is more than 60 to 80 km. Currently, transformation of flora are noted here, mesophilic meadowy types of vegetation are strongly damaged.

1.1 Flora. According to E. P. Korovin and I. I. Granitov (1949), the flora of the Karakalpak part of Ustyurt includes 165 varieties of flower plants collected by expedition of SaGU in 1944-1945 on the plateau and cliffs. 45 varieties of them, or 27 %, belong to Chenopodiaceae family. Since this list was made on the basis of summer and autumn collections, ephemera and many ephemeroids were not included in this list. Later collections of Ustyurt flora were supplemented of K.Koybagarov (1972), according to which the total number of varieties of the Karakalpak part of Ustyurt is 402. The author comprehends a wider region, including sand massifs in the northern part of the plateau (Sam, Matayku,). If we exclude the varieties collected on alkali soils and sands from the list of 402 varieties given in the unpublished summary of K.Koybagarov, the number of varieties typical for the plateau and cliffs will be 330. In that case, 19.7 % varieties

belong to pigweeds family. Studying the flora of the eastern cliff, B. Saribayev (1981) indicates 302 varieties. Later, B. Saribayev, S. Saparov (1977) for the north-western Ustyurt, indicate 426 varieties belonging to 225 geni and included in 41 families. The most authentical data on the flora of Karakalpak Ustyurt is the work of A. Allaniyazov, B. Saribayev (1983). In this work for the given region, the authors give 406 plant varieties of 208 geni, included in 46 families. When analyzing the flora of the whole Ustyurt, B. Saribayev (1987(had identified that the flora of that region includes 724 varieties belonging to 295 geni and 60 families.

According to of A. Allaniyazov (1995), in the species diversity of Ustyurt, the family of *Chenopodiaceae* (91) is on the first place, *Asteraceae* (48) on the second place, *Brassicaceae* (43) on the third place, *Poaceae* (27) on the fourth place and *Fabaceae* (24) on the fifth place. In the plant cover of the Ustyurt Plateau, perennial grasses are first in the specific weight, then follow: annual plants, subshrubs, small bushes, biennial plants, tree and bushes.

Nevertheless, the species composition of Karakalpak Ustyurt is not yet studied in full. An example of this is the new variety of *Allium usturtense* found by us in the expedition to the Ustyurt Plateau in May last year.

Among the endemics of the gypseous desert, we may specify on *Malacocarpus crithmifolius, Salsola chivensis* и *Sisymbrium subspinenscens*, encountered on strongly gypsiferous soils of Ustyurt.

1.2 Vegetative Cover. Vegetative cover of the main regions of the gypseous desert strongly differs, first of all, by the composition of edificatory. It is composed on Ustyurt, according to I. F. Momotov (1973), with few varieties forming monodominant communities, these are *Salsola arbusculiformis, Anabasis salsa, Artemisia terrae-alba, Haloxylon aphyllum, Salsola orientalis.* In rare cases, the dominants and subdominants of plant communities are *Salsola arbuscula, Atraphaxis spinosa, Stipa richteriana, S. hohenackeriana, S. Gemmascens, Nanophyton erinaceum.*

In the south of Ustyurt, large areas are occupied by homogeneous plant cover of biyurgun association forming monotonous grey background for many kilometers. Microcomplex combination of associations of biyurgun, wormwood, black saltwort (boyalish, *Salsola arbusculiformis*) and some other plants in the central and northern part of Ustyurt give the plant cover the original features inimitable anywhere in Uzbekistan. In favourable years for climatic conditions, with good aftergrowing of plants, the Ustyurt flora form beautiful carpet of regularly combined vegetative associations.

Relative poorness of the plant cover of Ustyurt with grass plants, in particulars, with ephemeras, is reflected in limitation of the composition of associations. The cover is often formed by one variety with homogeneous arrangement of plants throughout the area of association. Normally, the associations of biyurgun, wormwood, black saxaul look this way. Only *Rheum tataricum, Atraphaxis spinosa* and *Stipa richteriana* are well noticeable on the backgrouns of wormwood and saltwort.

The plant cover of Ustyurt as well as other gypseous deserts, its structure and dynamics are closely associated with the conditions ambient environment conditions. On the opinion of E. P. Korovin (1949), after draining of sarmatian strata in Miocene Ustyurt is in the zone of arid climate. Settlement of its area with vegetation took place from coastal-marine flora. Vegetative landscape on Ustyurt were formed by the plants of primary hamada and variegated flora (Popov, 1923), which fragments survived in the present plant cover of the plateau in form of scarce species. E. P. Korovin (1949) included *Salsola chivensis, Sisymbrium subspinescens, Cleome noeana, Seseli tenuifolium, S. cuneifolium, Zigophyllum macropterum, Z.brachypterum, Z. eichvaldii, Z.turcomanicum* in their number.

Main Formations and Associations of Ustyurt. Convolvulaceous formation. I. I. Granitov (1967) considers shrubby bindweed as a relict plant. One association is known on Ustyurt with domination of *Convolvulus fruticosus* – absinthial-athrataxis-convolvulaceous formation on grey-brown gypsiferous soil. An area of

that association was described near Baychagir. In the list of plants of the associations, E. P. Korovin and I. I. Granitov (1949) noted *Convolvulus fruticosus, Atraphaxis spinosa, Artemisia terrae-alba, Anabasis salsa u Stipa sp.*

In the composition of black saltwort formation, I. I. Momotov (1973) allocates 2 associations: black-saltwort and wormwood-black-saltwort. The first association is typical only for Ustyurt, and the second one is also described in Kizilkum. Floristic composition of the black-saltwort association is lean. In addition to *Salsola arbusculiformus*, the following plants occur : *Atraphaxis spinosa, Convolvulus fruticosus, Artemisia terrae-alba, Asparagus bresleriana, Stipa richteriana, Astragalus erioceras, Scorzonera pusilla, Rheum tataricum*, etc. On the author's opinion, wormwood-black-saltwort on grey-brown soils of Ustyurt may be considered as transitional one between saltwort and wormwood. Floristic composition is lean here as well and consists of only 7 varieties. In addition to wormwood and saltwort, the following plants are noted: *Stipa hohenackeriana, Anabasis salsa, Convolvulus fruticosus, Eremopyrum buonapartis, Ceratocarpus utriculosus.*

On grey-brown soil of Ustyurt, in the composition of whitesoil-wormwood formation, E. P. Korovin and I. I. Granitov (1949) allocated whitesoil-wormwood association. In addition to wormwood, keyreuk (Oriental saltwort, *Salsola orientalis*) and biyurgun, the following plants are noted on the described areas: *Stipa szowitsiana, Ceratocarpus utriculosus, Eremopyrum distans, Diptychocarpus strictus.* Later, I. F. Molotov (1953) allocated another 2 associaitons in that formation: athrataxis-stipa-whitesoil-wormwood (consisting of 7 varieties) and black-saxaul-pieplant-whitesoil-wormwood. The latter association is described in the area of Kosbulak in a slightly sloping depression. Botanic composition is quite rich here and consists of 36 varieties of flower plants. Specifity of floristic composition is characterized with comparatively low percentage of annual plants that is typical for the Ustyurt communities.

Special attention should be paid to biyurgun areas occupying about 3.5 million hectares within Karakalpak Ustyurt. E. P. Korovin and I. I. Granitov (1949) note that the pure biyurgun areas occupy several thousand hectares to the south of Karakalpak Ustyurt on the outskirt adjacent to Sarikamish, as well as to north-east from Barsakelmes. On these massifs, biyurgun areas take 90-95 %, and to the north 40-60 %. I. F. Momotov (1973) noted the following associations within this formation: biyurgun, lichen-biyurgun, waterweed-biyurgun, tasbiyurgun-biyurgun, tytr-biyurgun, black-saltwort-biyurgun, keyreuk-black-saltwort-biyurgun, wormwood-biyurgun, marsh-beet-wormwood-biyurgun.

The most comprehensive information of plant communities of Ustyurt can be found in the work of A. Allaniyazov (1995). The author has allocated 70 associations belonging to 19 formations, 9 cenotypes and 5 edaphotypes, within the Karakalpak Ustyurt.

1.3. Main Edificators of the Ustyurt Plateau Plant Cover

Salsola arbuscula. 50 to 100 cm high bush. One of the prevailing varieties of bush plants of the Ustyurt Plateau, typical for rank soils, gypsiferous alkali soils.

Artemisia terrae-albae. Subshrub, up to 50 cm in height. Pure absinthial bushed are widespread in the southern part of Ustyurt. Mixes with biyurgun, Oriental saltwort and other plants are seen in the north. Absinthial landscape is widespread throughout Ustyurt.

Anabasis salsa. Subshrub, up to 8 – 35 cm in height. It is widespread throughout Ustyurt. Succulent halo-gypsophyte. Biyurgun landscapes are one of the characteristic features of the Ustyurt Plateau.

Convolvulus fruticosus. 80 to 120 cm high bush. It growth on Ustyurt, on stony-rubbly locations. It is a fodder. It is eaten by sheep, goats and camels throughout whole vegetation period.

Haloxylon aphyllum. 1.5 to 5 m high desert tree. Pronounced edificatory from the group of desert arborous plants. Floristic composition of black saxaul areas is very

rich and contains more than 25 – 27 varieties. Ustyurt saxaul deserts are called as "karatyuley" (i.e. saxaul jungles) by local inhabitants. Massifs of old undergrowths survived in the vicinity of Churuk Kosbulak, Saksaulsay. It is not in the category of endangered plants, but incorrect procurement causes depletion of its undergrowths. Good fodder plant.

Tamarix hispida. 2.0 to 4.5 m high bush. Saliferous thallophyte. Good firewood. Leaf fall is well eaten by animal in autumn and winter, generative, sprouts in autumn and spring.

Halocnemum strobilaceum. Succulent leafless bush, 30 to 60 cm high. Halophyte-Edificator of closed depression of Ustyurt. Typical ecotopes are alkali soils. Floristic composition of its communities is very poor, normally it forms rarefied, sometimes compact brushwood. It is seen on the plateau, on alkali soils of closed recessions of Barsakelmes, Assakeaudan, Karashore, Kosbulakshore, Sam, Asmantay-Matae, etc.

Kallidium caspicum. 70 to 80 cm high halophyte bush. Succulent xerophytes. Typical edificatory of alkali soil ecotopes of very diversified stages of formation. Normally seen around drainless depressions of the Ustyurt Plateau.

Halimocnernis villosa. 15 to 35 cm high annual succulent saltwort. Euxerophyte, halophyte. One of characteristic plants of claypans on the Ustyurt Plateau. It is valued as a good autumn-winter fattening feed, especially with climacoptera.

Climacoptera lanata. 10 to 40 cm high annual grass plant. The most valuable fodder plant of saline deserts. Typical ecotopes are sandy depressions, periphery of salted claypans, ofter seen among saxaul bushes.

Anabasis aphylla. 35 to 65 cm high subshrub, leafless succulent. Typical ecotopes are takyr-like depressions. Rarely seen in the sourthern and central part of the Ustyurt Plateau.

Anabasis tukestanica. Dominates in the plant cover of Southern Ustyurt. 35 to 40 cm high subshrub. Thick stem at the base.

Ammodendron conollyi. 4 varieties are meet on Ustyurt: A. conollyi, A. karelenii, A. longiracemosum, A. eichvaldi. All ones are typical psammophytes. Out of them, only A. conollyi is edificator. Occurs on sand massifs.

Carex physodes. Perennial grass plant, 15 – 24 cm high, ephemeroid. Occupies vast area on Ustyurt, especially on sandy locations. Appears together with ephemers. Beaked sedge (Carex physodes) dominates on the plateau among ephemers and ephemeroids.

Poa bulbosa. Perennial grass plant, ephemeroid. One of the main fodder plants of Ustyurt.

Rheum tatarcum. Perennial grass plant, ephemeroid. Widespread on Ustyurt, on dampy alkali soils, somewhere occurs very abundantly. One of valuable fodder plants of Ustyurt.

Eremopyron orientale. Annual grass plant. Widespread throughout Ustyurt on non-saline sandy soils and sands. One of the main fodder plants of Ustyurt.

Agropyron fragile. Perennial grass long-time vegetative plant with dense and large sod cover, 40 – 85 cm high. Good fodder, belongs to plant group woth spring-summer vegetation. Widespread throughout the Ustyurt Plateau.

1.4. Flora of the Contract Area of Ustyurt

Tayli. According to unpublished data (Ustyurt Flora Map prepared by U. Allanazarova, 1988), whitesoil-wormwood-biyurgun complexes are registered within the area of Tayli on grey-brown loamy, alkali-saline soils. Keyreuk-biyurgun association is separated within this complex, somewhere with participation of *Nonophyton erenaceum* and *Artemisia terrae-alba* on alkali-saline soils.

Akushpa. On grey-brown loamy, alkali-saline soils, as well as on the Tayli area, whitesoil-wormwood-biyurgun complexes are widespread. On salt marsh, a number of reed-tamarisk-shorazhrek-tamarisk alkali-soil communities are noted.

Reed association with participation of tamarisk *Tamarix elongate, T. laxa* is separated within that range.

Within the area of **UGCC**, on loamy alkali-saline soils, U. Allanazarova allocated biyurgun-whitesoil-wormwood and saltwort associations, somewhere with sarzasan *Halimocnemum sp.*, included in the biyurgun-whitesoil-wormwood complex.

Flora and Vegetation of Drained Bottom of Aral Sea. Today, scientific literature don't have sufficient information of flora and vegetative cover of dried part of Aral Sea. According to the latest data (Sherembetov, 2009), the flora of the south-western part (Uzbekistan part) of dried bottom of Aral Sea includes 135 varieties of flower plants belonging to 72 geni and 26 families, where pigweeds family dominates appropriate for all Central Asia deserts.

A number of projects for improvement of ecological systems and preservation of biological diversity has been implemented in Karakalpakstan. One of them is the Project of UNDP-GEF – Achieving of Stability of Ecosystems on Degraded Lands in Karakalpakstan and Kyzylkum Desert. In the framework of this project, a tree nursery has been established on the degraded lands of Kazakhdaryo on the area of 1.0 ha for growing of seedlings of black saxaul. For testing a range of various species of tree plants on the area of 0.75 ha, 13 varieties if tree plants have been planted, 30 to 100 pieces of each breed (English elm, honey locust, Asiatic poplar, Spanish broom and others). Drift sands have been fixed with bespread lengthways cellular protection with subsequent planting of black saxaul on the area of 1.5 ha (Novitskiy, 2009).

Some scientists (Ashurmetov et al, 1998; Kurbaliyazov, 2000; Rafikov, 1998, Shomurodov et al, 2007) have been studying the processes of formation of landscapes, trend of development of the components of natural-territorial complexes and mapping plant associations of exposed part of the Aral Sea bottom. There is the map of vegetation for certain areas of the dried sea bottom

(Ashurmetov et al, 1998; Shomurodov et al, 2007). But a single map reflecting the plant cover of the whole dried Aral bottom is absent.

A tamarisk formation is registered on alkali soils and wind-blown bare sands of the Surgil Project area. An annual-saltwort-tamarisk association is rarely separated within this formation, somewhere with eremosparton. Botanic composition of this association consists of the following varieties: *Tamarix hispida, T.ramosissima, Etemosporton aphyllum, Bassia hysopifolia, Atriplex fominii, Salsola foliosia, Suaeda crassifolia, Phragmites australis*, etc.

Within the Uchsay project area, 2 types of vegetation are noted: *Psammophyta* and *Gypsophyta*. In the composition of the first type, tamarisk-annual-saltwort-kuyansuyak-cherkez association with participation of black saxaul is described, belonging to cherkez formation. In the composition of gypsophilic vegetation, ephemeroid-saltwort-mixed-wormwood association with bushes, annual-saltwort-tamarisk-singren association, somewhere with harmala shrub karabarak-tamarisk-harmala association are allocated, belonging respectively to the formations of spreading wormwood, singren and harmala shrub.

1.5. Scarce Plant Species Entered in the Red Book of Uzbekistan and Occurring on the Contract Area

The last edition of the Red Book of Uzbekistan (2009) includes 4 tracheophytes growing on Ustyurt:

1. *Malococarpus crithmifolius* (Retz.) C.F.May. Status 2. Scarce relict variety in Uzbekistan of monotype genus. Outside Uzbekistan, it occurs in Kazakhstan, Turkmenistan, Iran. Habitat: pebblestone, saline soils near fresh and mineralized springlet.

2. *Climacoptera ptiloptera* U.P.Pratov. Status 2. Rare endemic of Ustyurt. Occurs on Ustyurt and on the eastern cliff on grey-brown saline soils.

3. *Euphorbia sclerocyathium* Korov.et M.Pop. Status 2. Widespread on Ustyurt, in vicinity of Tabancy water well, Karin-yarik settlement, Barsekelmes

village. Outside Uzbekistan, it occurs in Turkmenistan. Habitat: Hamada and sand deserts, alkali soils, saline grey-brown soils.

4. *Salsola chiwensis* M.Pop. Status 3. Relict variety of North Uzbekistan. Widespread on Ustyurt and in residual mountain of Kyzylkum, Outside Uzbekistan, it occurs in Turkmenistan. Habitat: grey-brown gypsum and marly soils.

In addition to the above varieties on the cliff and dried Aral bottom, the following endemic varieties occur, which need protection and are not included in the Red Book: *Crataegus korolkowii L. Henry*, *Artemisia austriaca Jacq.*, *Atriplex pratovii Sukhor*., and *Crambe edentula Fish. et Mey.*

Analysis of the above data shows that it is necessary to conduct scientific research to identify the existence of population of scarce and endemic varieties of plants within the area of planned gas production and gas pipelines construction; organize collection of seeds of scarce and endangered plant varieties and sow them in ecologically similar ecotopes. Another effective method of preservation of rare varieties is transplanting of bushes (shrubby plants) on ecotopes suitable for them. It is advisable to provide annual monitoring and assessment of the state of vegetation within the areas where gas production is planned. In case of reduction of biomass, seeds of native species should be sown for the purpose of reduction of the rates of desertization process.

2. METHODS OF FIELD STUDIES OF BIOLOGIC DIVERSITY

The studies of biologic diversity of plant cover are based on monitoring on representative points along the botanical route.

Traditional geobotany and ecology methods set forth in the classical manuals were used as methodical basis: Field Geobotany (1959-1972); Brief Guide of Geobotanic Studies (1952); Communities and Ecosystems (Wittecker, 1980); Quantitative Ecology of Plans (Graig-Smith, 1967). Special attention was paid to system approach. When describing the plant communities, variety composition, plant height, abundance under B. M. Mirkin scale, location according to B.A.Bikov (1978), projective coverage, number of individuals of dominant varieties were taken into account. Field studies of the flora of the Contract area (Uchsay, Surgil, Karatereng, Tayli, Akushpa sections and Ustyurt Gas-Chemical Complex) (Fig. 1) had been performed for assessment of the current state of various types of the places of growing of the main types of vegetation, clarification of variety composition, determination of the number and area distribution of the main edificators, as well as endemic, relict, endangered varieties and those entered in the Red Book of Uzbekistan, congeners of cultivated plants.

Specific feature of this study was obligatory fixation of geographical coordinates of occurrences of scarce Red Book plant valieties.

Determination of floristic composition and area distribution of plant associations was accompanied by visual observations, photographing and maintaining field logbook.

When solving the issues of systematic, classical morphologic-geographical methods (Popov, 1927), Illustrated Classifier of Seed Plants of Karakalpakstan and Khorezm (1983), Central Asia Plant Classifier (1993) were used.

The condition of the habitats of the plant cover was fixed with photographs for comparison with possible changes on these areas in the course of Project implementation.

Special equipment was used for performance of field works: field-glass, hoe, shovel, digital photographic camera, reference guide qualifier, herbarium grid, mapping materials (topographic maps and printouts of satellite images of Google, GPS Garmin ETREX).

Preliminary items of investigation of plant cover were determined in the most characteristic places of its distribution. Since the condition of the plant cover is directly associated with the existing and planned technogenous burden, field surveys were affixed to the project areas of the activities of Uz-Kor Gas Chemical.

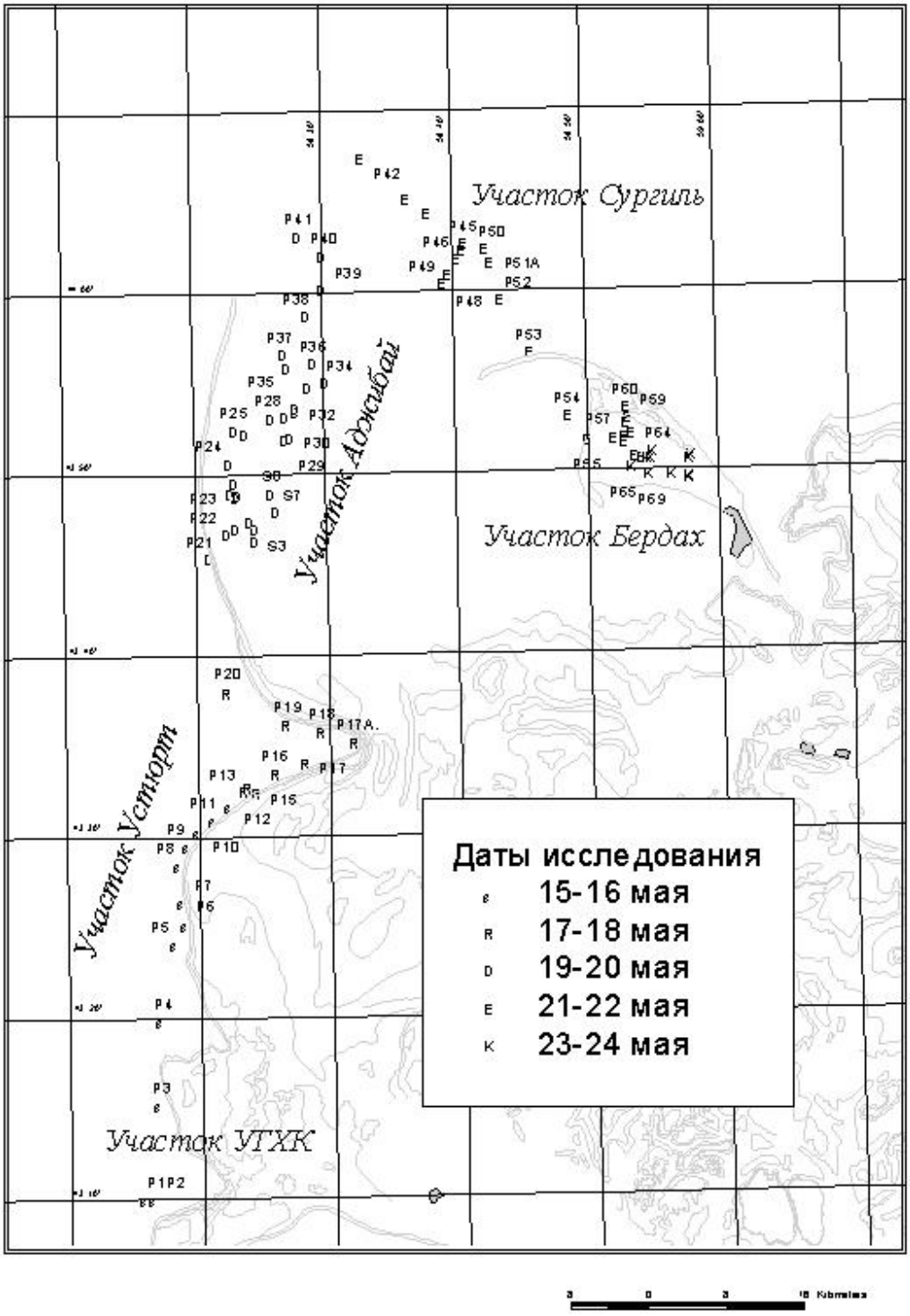

Fig. 1. Location of Work Areas

Movement Route

15 May – relocation Nukus – Kungrad –Ustyurt (UGCC)

15-16 May – processing of section of UGCC

17-18 May – relocation to the section of Urga-Tayli Karatereng, processing

19-20 May – relocation to the section of Ajibay, processing

21-22 May – relocation to the section of Surgil, processing

23-24 May – relocation to the section of Eastern Berdah, processing

25 May – return to Nukus

3. RESULTS OF FIELD STUDIES OF FLORA

3.1. UGCC Section

Since very few precipitations have fallen in Ustyurt in winter-spring period (2010-2011), variety composition was relatively poorly diversified. In this connection, during field works, many previously growing varieties were absent on this area, this mainly relates to ephemers and ephemeroids as well as a number of endemic, relict and scarce varieties.

Within the area of the future Ustyurt Gas Chemical Complex, in addition to the key area, the 11 points have been surveyed for clarification of botanic composition of the area and main plant communities. Variety composition of the plants of these points is given below.

Coordinates of the key area: N 43.19.799 E 053.17.021

The studied area is a saline gypsophyte desert. The basis of the plant cover is biyurgun formation. Vegetation is represented by typical gypsophilic varieties. In addition to biyurgun, several varieties of saltwort and ephemers and ephemeroids are present here. Among subshrubs, we should note *Artemisia terae-albae, Salsola orientalis,* and among bushes *Salsola arbuscula*, *Atraphaxis spinosa* varieties of the genus *Calligonum*. Bindweed blooms, kandym Calligonum fructifies. Among grass plants, *Convolvulus hamada, Limonium otolepsis, Suaeda salsa*, *Atriplex cana* occur. In the general evolution of the Ustyurt ecosystems, biyurgun areas *Anabasis salsa* – are carriers of desert trends of development. The structure of the community is very mosaic. Majority of researchers note that wide spread of biyurgun areas, their identification during land studies makes them important indicators of soil conditions. The area is flat, grey-brown claypan soil.

Point 1. Coordinates. N 43.09.916 E 053.15.574

On the key area, the flora is represented with keyreuk-biyurgun association. Variety composition of the community is represented with the following varieties: *Salsola arbuscula L*, *Anabasis salsa*, *Convolvulus hamadae.* The area is flat, grey-brown claypan soil.

Point 2. Coordinates. N43.09.910 E 058.16.182

Vegetation is rarefied. Separate bushes of saxaul *Haloxylon persicum* and sandy bindweed *Convolvulus hamadae* occur on the boundaries. The area is flat, claypan soil. Abandoned holes of small mammals are noted.

Point 3. Coordinates. N 43.15.125 E 053.16.817

Within the biyurgun-saxaul associations, the following plant varieties are registered: *Tamarix hispida*, *Haloxylon persicum*, *Salsola arbuscula*, *Anabasis salsa*, *Convolvulus hamadae*, *Climacopera aralensis*, *Chenopodium alba.* Irregular microrelief, tuffets here and there, grey-brown claypan soil (Fig.2).

Point 4. Coordinates. N 43.24.005, E 058.18.189.

Biyurgun association is noted here. Within this association: the following plants occur: among bushes: -keyreuk -*Salsola orientalis*, boyalish *Salsola arbuscula*, among subshrubs: - biyurgun- *Anabasis salsa*, tasbiyurgun -*Anabasis brachiata*, whitesoil wormwood- *Artemisia terrae-albae*, subshrub marsh-beet -*Limonium suffruticosum* and among perennial plants: some bushes of harmala shrub - *Peganium harmala*. Irregular microrelief, claypan soil.

Fig.1. Orach – *Atriplex cana*

Fig.2. General plan of the area

Point 5. Coordinates.N 48.25.101, E 058.18.935

Botanic composition of this area is relatively rich. Here we noted mixed-grass-biyurgun association. The following varieties were registered in this association: bushes - low kandym *Calligonum humile,* goat's-wheat *Atraphaxis spinosa*; subshrubs – whitesoil wormwood *Artemisia terrae-albae*, keyreuk *Salsola orientalis*, biyurgun -*Anabasis salsa*; perennial – Haplophyllum ramosissmum, Aral climacoptera *Climacoptera aralensis*, *Astragalus lasiophyllus, Astragalus amarus*, *Eremopyrum orientalis*, fetid gum *Ferula assa-foetida* dried.

Irregular microrelief, soil with mussels.

Point 6. Coordinates.N 43.26.333, E 059.18.695.

The following varieties are noted on the described area: bushes- Russian wolfberry - *Lucium ruthenicum*, low kandym - *Calligonum humile,* fruticous bindweed - *Convolvulus fruticosus* (Fig.3), tasbiyurgun -*Anabasis brachiata*; subshrubs - whitesoil wormwood - *Artemisia terrae-albae*, keyreuk *Salsola orientalis;* perennials – bean caperbush Zy*gophyillum ovirgerum*, Turkmenian bean caperbush - Zy*gophyillum turkomanicum,* yantak -*Alhagi pseudalhagi*, marsh-beet *Limonium otolepis*, *Aeluropus litoralis*, *Asparagus bresieranus*. Land is non-smooth, hillocks, majority of varieties are noted in ravines.

Fig.3 Shrubby bindweed - *Convolvulus fruticosus*

Point 7. Coordinates.N 43.28.339, E 058.18.571.

This point is located to the east of Sudochye Lake. Vegetaton is rarefied. Projective cover doesn't exceed 60-70%. But majority of ephemeroids are dried. The following varieties are registered: *Rhinopetalum karelinii,* milkweed - *Tithymymalus densus*, *Eremopyrum orientalis* (Fig. 4), Russian wolfberry - *Lucium ruthenicum,* tasbiyurgun *Anabasis brachiata*. The area is flat. Sandy soil.

Point 8. Coordinates.N 43.29.422, E 058.19.173

Botanic composition of the described area is rarefied. Biyurgun-keyreuk association is noted. The associations are based on biyurgun *Anabasis salsa* and whitesoil wormwood - *Artemisia terrae-albae*. Dried occurrences of *Rhinopetalum karelinii* are met in some places. The area is flat, clay sand.

Fig.4. *Eremopyrum orientalis*

Point 9. Coordinates.N 43.30.200, E 058.19.962

Biyurgun - *Anabasis salsa* prevails in the plant cover. Here, in addition to biyurgun, the following plants occur: bushes – goat's-wheat *Atraphaxis spinosa*, subshrubs – keyreuk *Salsola orientalis*, perennials - astragalus *Astragalus ammophilus*, tasbiyurgun *Anabasis brachiata*, bean caperbush Zygophyillum *ovirgerum*, Turkmenian bean caperbush - Zygophyillum *turkomaicum*. Flat relief. Claypan soil.

Point 10. Coordinates.N 43.30.825, E 058.21.160

Vegetation is rarefied. Projective cover is 50-60%. Stand of grass is based on *Ceratocarpus utriculosus* and goat's-wheat *Atraphaxis spinosa*. In addition to the above varieties, the following ones are noted: sand bindweed- *Convolvulus hamadae*, tasbiyurgun- *Anabasis brachiata*, cibol -*Allium sabulosum*. Separate bushes of saxaul *Haloxylon persicum* occur along boundaries. Flat relief, claypan soil.

Point11. Coordinates.N 43.31.560, E 058.22.333.

Shrubby-wormwood association. The following varieties grow: trees – saxaul *Haloxylon persicum*; subshrubs – keyreuk *Salsola orientalis,* perennial grasses - *Zosimia orientalis*, sand bindweed *Convolvulus hamadae,* dried *Schumannia karelinii*, dried *Rhinopetalum karelinii*, *Eremopurum orientalis*, *Astragalus lasiophyllus,* bitter astragalus *Astragalus amarus*, Aral climacoptera *Climacoptera aralensis*. The area is flat, claypan soil.

3.2 Ustyur (Akushpa, Tayli, Urga)

Coordinates of key area. N 43.32.333, E 058.24.419.

The basis of plant cover is the biyurgun-shrubby association (Fig.5). The following varieties grow within the communities: common ephedra *Ephedra distachya*, white soil wormwood -*Artemisia terrae –albae*, *Ceratocarpus utriculosus*, Russian wolfberry *Lycium ruthenicum*, bindweed *Convolvulus hamadae*, yantak *Alhagi pseudalgahi*, *Haplophillum ramosissimum*, tasbiyurgun *Anabasis brachiata*, onion *Allium sabulosum*, *Schumannia karelinii*, threeawn *Aristida pennata*, *Eremopyrum orientalis*, Khiva saltwort *Salsola chiviensis*. A specific feature of this association is participation of the Red Book variety of Khiva saltwort *Salsola chiviensis*. Irregular microrelief. Soil is rubbly claypan.

Fig. 5. Biyurgun areas on claypan soils

Point 1. Coordinates: N 43° 30′ 35.4, E 58° 20′ 29,0

Mixed grass-wormwood association. This key area is established on mixed grass and whitesoil wormwood area. The relief is non-smooth, clay soil. Vegetation is represented with gypsophilic and ammocolous. As distinct from previous points, ephemers and ephemeroids occur often on the described area. A poaceous-wormwood association is noted in the key area. The following varieties occur here: whitesoil wormwood *Artemisia terrae-albae*, *Aeluropus litoralis*, *Ceratocarpus utriculosus,* Aral climacoptera *Climacoptera aralensis*, orach *Atriplex cana,* frost-blite Chenopodium albium, as well as yantak Alhagi pseudalhagi. Soil is grey-brown, claypan, pits occur with outlets of white gypsum (Fig. 6).

Point 2. Coordinates: N 43.32.403, E 058.23.407.

Vegetaton is rarefied. Projective cover 50-60%. Keyreuk association with participation of subshrubs is registered. Stand of grass is based on keyreuk -*Salsola orientalis*, subdominant is whitesoil wormwood- *Artemisia terrae–albae.* Somewhere occur tasbiyurgun -*Anabasis brachiata* and bean caper -Zy*gophyillum ovirgerum*. Dry occurrences of last-year grass plants retained under bushes. Flat relief, claypan soil.

Fig. 6. Mixed grass-wormwood association

Point 3. Coordinates:N 43.32.676, E 058.23.792.

Mixed grass-keyreuk association by the relief conditions doesn't differ much from the previous ones. The following varieties are noted in the first tier of the associations: boyalish -*Salsola arbuscula,* whitesoil wormwood *Artemisia*, keyreuk - *Salsola orientalis* and sand bindweed- *Convolvulus hamada*, in the second tier - biyurgun *Anabasis salsa*, tasbiyurgun - *Anabasis brachiata*, *Haplophillum ramosissimum*, *Astragalus lasiophyllus*, bitter astragalus - *Astragalus amarus*. In the third tier, significant place is taken by *Eremopurum orientalis*.

Point 4. Coordinates: N 43° 33' 34.5, E 58° 27' 28.4

Biyurgun-keyreuk association. This association occupies huge areas on alkali sols of Ustyurt. The described area is established on the eastern cliff. Projective cover of the association is 70-75%, based on keyreuk. Botanic composition of the associations consists of the following varieties: Bushes – boyalish *Salsola arbuscula*, subshrubs – keyreuk *Salsola orientalis*, biyurgun *Anabasis salsa*, grasses – butter tree *Bassia hyssopifolia*, *Ceratocarpus utriculosus,* seepweed - *Suaeda salsa*, frost-blite - *Chenopodium alba*. Also, dried ephemers are noted here (*Eremopurum orientalis*, cibol *Allium sabulosum*). Grey-brown soil.

Point 5. Coordinates: N 43.33.391, E 058.25.825.

This key area is established on mixed grass-shrubby community.

The following varieties are noted in the first tier: Russian wolfberry- *Lycium ruthenicum*, boyalish -*Salsola arbuscula,* sand bindweed -*Convolvulus hamadae*, in the second tier – biyurgun *Anabasis salsa*, *Astragalus lasiophyllus,* Khiva saltwort- *Salsola chiviensis*, *Haplophillum ramosissimum*, whitesoil wormwood- *Artemisia terrae-albae*. Lower tier is represented with small quantities of - *Eremopurum orientalis.* Non-smooth relief, claypan soil.

Point 6. Coordinates: N 43.33.954, E 058.28.197.

Irregular microrelief. Eastern exposition. Vegetation is relatively rich compared with previous points. Mixed grass-ephedra communities are registered here/ The following varieties grow within the communities: Oriental clematis *Clematis orientalis* (Fig. 7), keyreuk *Salsola orientalis*, Turan wormwood *Artemisia turanica*, common ephedra *Ephedra distachya*, *Zosima orientalis, Schumannia karelinii*, Russian wolfberry *Lycium ruthenicum*, yantak *Alhagi pseudalgahi*, *Aeluropus litoralis*, sand bindweed *Convolvulus hamadae, Ceratocarpus*

utriculosus, *Aristida pennata*, *Haplophillum ramosissimum*, Siberian wheatgrass *Agropyron sibiricum*. Relief is non-smooth, soil is stony-sandy.

Point 7. Coordinates: N 43.35.100, E 058.31.938.

Soil of the described area is claypan. Irregular microrelief. Plant cover consists of biyurgun formation, biyurgun association. Annual green branches take 10-15% of the total above-ground phytomass. In natural conditions, biyurgun has two ecoraces: gypsophilic and halophilic. Gypsophyte ecorace of biyurgun is prevailing on the described area. The following varieties are registered within the community: cibol- *Allium sabulosum* (Fig. 8), thorny goat's-wheat *Atraphaxis spinosa*, sand bindweed -*Convolvulus hamadae*, tasbiyurgun -*Anabasis brachiata*, *Schumannia karelinii*, bean caper -*Zygophyillum ovirgerum*, Russian wolfberry *Lycium ruthenicum*.

Point 8. Coordinates: N 43.35.633, E 058.29.432

Gypsiferous soil. Irregular microrelief. Edificator of plant cover of this point is whitesoil wormwood - *Artemisia terrae- albae.* Association of whitesoil wormwood is widespread on the Ustyurt Plateau. Brushwood of whitesoil wormwood on Ustyurt are formed in slightly noticeable recessions preliminarily meliorated with some more dampening due to surface flow of atmospheric precipitations. Normally, by botanic composition, association of whitesoil wormwood is more rich compared with biyurgun and boyalish. But due to unfavourable weather situation in this year, only few varieties are noted in this association: boyalish- *Salsola arbuscula*, keyreuk *Salsola orientalis, Ceratocarpus utriculosus, Eremopyrum orientalis.*

Fig. 7. *Clematis orientalis*

Fig. 8 *Allium sabulosum*

Point 9. Coordinates: N 43.36.097, E 058.26.821.

Soil of the described point is claypan. Non-smooth microrelief. Here we note wormwood- biyurgun-saxaul association. Projective cover 50-60%. White saxaul dominates. The following varieties were growing in this association: saxaul *Halohylon persicum*, biyurgun -*Anabasis salsa*, tasbiyurgun -*Anabasis brachiata* (Fig. 9), whitesoil wormwood - *Artemisia terrae- albae*, *Ceratocarpus utriculosus*, bindweed *Convolvulus hamadae*, *Eremopurum orientalis*, keyreuk *Salsola orientalis*, *Astragalus lasiophyllus*.

Point 10. Coordinates: N 43.37.947, E 058.22.251.

The point of monitoring survey is set on wormwood association. The soil of the studied area is grey-white. 7 varieties of vascular plants are noted in this association: whitesoil wormwood- *Artemisia terrae- albae*, mat-grass *Stipa richteriana*, *Eremopurum orientalis*, *Astragalus lasiophyllus*, biyurgun *Anabasis salsa*, boyalish *Salsola rigida*, goat's-wheat *Atraphaxis spinosa*.

Fig. 9. *Anabasis brachiata*

3.3 Ajibay Section

Environmental conditions on the Ajibay Section are diversified. Plump alkali soils, alkaline soil, slightly saline grey-brown soils and somewhere marsh occur here. Respectively, various ecological groups of plants occur here depending on the natural and territorial complex. Due to this, we allocated 2 key areas.

Coordinates of 1 key area: N 43.53.061. E 058.27.033.

Soil is saline. Halophytes prevail in the plant cover. Here we allocate tamarisk-karabarak association. Projective cover 80%, stand of grass is based on tamarisk varieties (*Tamarix hispida, Tamarix laxa,Tamarix pentandra).* IN addition to tamarisk, in some places southern reed *Phragmites australis* и *Halostachys caspica* form some brushwood. In addition, plump alkali soils are developed in this point, where projective cover is 0 %.

Coordinates of 2key area: N 43.50.536, E 058.22.648.

Soil is clay, saline. Edificator of plant cover is white saxaul *Halohylon persicum*. Projective cover -70-80%.

Totally 18 points have been surveyed on the Ajibay Section. Vegetation is homogeneous in many points. If saxaul dominates in 1, 3, 4, 5, 6 and 7, in other points edificators of plant cover are varieties of *Tamarix* (Fig. 10) and in some case prevailing *Halostachys caspica* (Table 1.)

Table 1.

List of Plants of Ajibay Section

Point No.	Coordinates	Plant name	Comment
1	N 43.45.279, E 058.21.037	*Haloxylon persicum* *Eremopurum orientalis* *Salsola orientalis*	Projective cover 30-40%. Dominating white saxaul
2	N 43.46.583, E 058.22.467	*Tamarix hispida* *Nitraria sibirica* *Lucium ruthenicum*	Projective cover 50-60%. Edificator is tamarisk
3	N 43.48.896, E 058.22.822	*Halohylon persicum* *Eremopurum orientalis*	Young plantlets of white saxaul are noted
4	N 43.50.536. E 058.22.648	*Haloxylon persicum* *Climacoptera aralensis*	Saxaul forms dense forest. Projective cover 80%.
5	N 43.52.411. E 058.23.148	*Haloxylon persicum* *Suaeda salsa*	Projective cover 40-50%.
6	N 43.52.157.	*Haloxylon persicum*	Saxaul is sown.

	E 058.23.907		Second growth is noted
7	N 43.52.976. E 058.25.905	*Haloxylon persicum*	Saliniferous wasteland. Projective cover 5-7%.
8	N 43.51.752 E 058.26.927	*Tamarix hispida* *Halostachys caspica*	Projective cover is 30-40%.
9	N 43.51.890. E 058.27.356	*Tamarix hispida* *Halostachys caspica*	Projective cover 30-40%
10	N 43.53.301. E 058.27.768	*Tamarix hispida* *Phragmites australis*.	Projective cover 40-50%. Dominating tamarisk.
11	N 43.53.554. E 058.27.826	*Halostachys caspica* *Tamarix hispida*.	Due to dense overgrow of *Halostachys caspica* Projective cover reaches 70-80%.
12	N 43.54.652 E 058.28.845	*Tamarix hispida* *Halostachys caspica* *Phragmites australis*	Brushwood of tamarisk are noted. Projective cover 80-90%.
13	N 43.54.923. E 058.30.208	*Phragmites australis* *Aeluropis litoralis*	Pont flooded with water
14	N 43.55.778. E 058.27.285	*Tamarix hispida* *Tamarix laxa* *Tamarix pentandra*	Projective cover 60%. Edificator is *Tamarix pentandra*

		Suaeda salsa	
15	43.56.013. 058.29.258	*Tamarix hispida* *Tamarix laxa* *Halostachys caspica*	Projective cover 50-60%. Dominating *Tamarix hispida*
16	43.56.541. 058.27.002	*Tamarix laxa* *Tamarix pentandra* *Tamarix hispida* *Halostachys caspica*	Projective cover 70%. Dominating *Tamarix hispida*
17	N 43.58.659. E 058.28.817	*Tamarix hispida* *Tamarix laxa* *Halostachys caspica* *Suaeda salsa* *Climacopera aralensis*	Mixed-shrubby association. Projective cover doesn't exceed70%.
18	N. 44.00.128. E. 058.30.043	*Halostachys caspica*	Phytogenous hillocks overgrown with *Halostachys caspica* are noted

Fig.10 Tamarisk underbrush

3.4.Surgil Section

Coordinates of key area: N 44.02.190, E 058.40.806

Relief of the described area is flat. Soil is saline, grey-brown. Small sand massifs are in some places. Phytogenous hillocks are noted. Vegetation is rarefied. On alkali soils, white saxaul forms some groups. Varieties of kandym (*Calligonum aralense, Calligonum obtusum)* are prevailing on the sands. In some places, tamarisk bushes *Tamarix hispida* occur, *Tamarix laxa* – rarely. Separate phytogenous hillocks occur in the eastern part of the road, consisting of *Tamarix hispida* (Fig. 11). Annual plans frost-blite *Chenopodium album*, orach *Atriplex cana* grow in recessions. By diversity of flora, this section doesn't strongly differ from the previous. Basis of plant cover is formed by white saxaul, varieties of tamarisk.

Fig.11. ***Tamarix hispida***

Point 1. Coordinates: N 44.01.672, E 058.40.366

Soil of the described area is clay, saline. Varieties of *Calligonum(P. aralense, C. obtusum)* prevail in the plant cover. Second growth is noted under bushes of old individuals of kandym. Young individuals of white saxaul occur along the road. In recessions, orach *Atriplex cana* forms dense cover. Projective cover of soils is 60-70%.

Point 2. Coordinates: N 44.03.087. E 058.28.272

The surveyed point is set near the Kamka well. The soil of the surveyed area is grey-brown, saline. Vegetation is rarefied. Projective cover doesn't exceed 40%. Edificator of plant cover is *Halostachys caspica* (Fig. 12). Small bushes of *Tamarix hispida, Tamarix laxa* occur somewhere.

Fig. 12. Halostachys caspica

By botanic composition, the points 3 *(N 44.07.279, E 058.33.134),* 4 *(N 44.05.031, E 058.36.603) and* 5 *(N 44.04.263, E 058.38.192)* don't differ much, as salt marsh prevails in all points. Edificators of the surveyed area are varieties of tamarisk -*Tamarix laxa, Tamarix pentandra*, *Tamarix hispida*. In lower places, where soil salinity is high, *Halostachys caspica* forms some groups. Projective cover in third point - 40-50%, in fourth and fifth 60-70%. No grass plants is all areas.

Point 6. Coordinates: N 44.02.535, E 058.40.927

Technogeous landscape is excavated in some places. Soil is grey-brown. Here we note mixed-grass-kandym association. Dominants of the community are varieties of kandym (*Calligonum densum, Calligonum obtusum).* The following varieties are noted in the association: grass plants – frost-blite *Chenopodium album,* orach - *Atriplex cana*, southern reed - *Phragmites australis;* tamarisk bushes - *Tamarix hispida*, *Tamarix laxa, Tamarix pentandra*.

Point 7. Coordinates: N 44.02.190, E 058.40.806

Soil is grey-brown, saline. Small sandy areas as well as phytigenous hillocks occur in some places. Plant cover consists of mixed bushes, where edificator is *Haloxylon persicum,* and subedificator *Tamarix hispida.* Occurrence of *Tamarix laxa* is immediate. In addition to the above types, *Calligonum aralense, Calligonum obtusum* occur on the sands, which have second growth.

Point 8. Coordinates: N 44.01.672, E 058.40.366

Monitoring point was set on kandym formation. IN the plant cover of deserts, noticeable place is taken by juzgun areas (*Calligonum*) together with white saxaul (Fig. 13), forming one of the most widespread landscapes of sand deserts. Juzgun areas normally on secondary ecotopes appear as edificators, as it is seen in this point. Botanic composition is poor, but Projective cover is relatively high - 80% (due to bushes). The following varieties have been noted at this point: *Calligonum aralense, Calligonum obtusum, Calligonum densum*, *Haloxylon persicum, Atriplex cana*. All varieties of kandym are in fruit-bearing phase.

Fig.13. *Calligonum aralense, C. obtusum*

Point 9. Coordinates: N 44.00.796, E 058.39.669

Soil of the described point is sandy. As known, sandy soil has favourable water regime for growth and development of grass plants. In this connection, for the first time in the course of expedition, we noted orach association, with domination of annual grass - Atriplex cana. Within this association, in addition to orach, there are such grass plants as seepweed Suaeda salsa, climacopteras *Climacoptera aralensis*, *Climacopera arcuata*, oak-leaf goosefoot *Chenopodium glaucum*. Separate bushes of saxaul - *Haloxylon persicum* occur in some places.

Point 10. Coordinates: N44.00.331 E 058.39.259

The structure of plant cover of this point is close to the point 8. This key area is set in kandym community. Projective cover of soil 60-70%. The following varieties occur in the community: kandyms -*Calligonum aralense, Calligonum obtusum,*

Calligonum densum, in some places orach- *Atriplex cana*. Soil if clay, saline. Flat relief.

Point 11. Coordinates: N 44.02.208, E 058.42.463

Relief of the described point is almost flat. Soil is sandy with mussels. Here we note kandym-astragalus association. Basis of plant cover is formed by varieties of kandym and sand astragalus. Projective cover 80%. Botanic composition of the associations consists of the following varieties: *Calligonum aralense, Calligonum densum*, *Astragalus ammodendron* (Fig. 14), *Phragmites australis, Cornulaca korshinskyi*, *Alhagi pseudalhagi*, *Karelinia caspia*. Dried ephemers from last year occur. Multiple plantlets of astragalus - *Astragalus ammodendron* are registered.

Point 12. Coordinates: N 44.01.426, E 058.42.880; Point 13. Coordinates N 44.01.416 E 058.42.928.

These key areas were set near each other, along the two sides of roads in saxaul culture plant formation (Fig. 15). Seed sowing of white saxaul - *Halohylon persicum* is noted on the area of 30 ha. *Eremopyrum orientalis, Poa bulbosa, Climacoptera aralensis, C. lanata, Senecio subdentatus* occur under saxauls. Projective cover 40-50%.

Fig.14 *Astragalus ammodendron*

Fig. 15 Saxaul underbrushes

Point 14. Coordinates: N 43.59.409, E 058.43.559

Monitoring area was set near SKV. Soil is sandy. Vegetation is rarefied, consists of saltworts and bushes. Projective cover is not high 40%. Botanic composition consists of the following varieties: saxaul -*Haloxylon persicum*, Aral climacoptera-*Climacoptera aralensis*, Paulsen saltwort *Salsola paulseni,* some bushes of kandyms *Calligonum aralense, Calligonum obtusum.*

Point 15. Coordinates: N 43.56.480, E 058.45.745

Relief of the described area is hillocky sands. Here we noted mixed-grass-kandym association. Basis of the community is formed by kandym varieties. Edificator is *Calligonum aralense.* The following varieties are noted in the association*:* kandyms *Calligonum aralense, Calligonum obtusum, Calligonum densum*, astragalus -*Astragalus ammodendron*, *Eremopyrum orientalis*, Paulsen saltwort *Salsola Paulsenii*, mat-grass *Stipa bella*. Dried units of *Cornulaca korshinskyi*.

Point 16. Coordinates: N 43.52.943, E 058.48.662

Vegetation is rarefied. Projective cover is not high – 40%. Dominant of plant cover is *Calligonum aralense*. Botanic composition of the described area is poor and consists of only three varieties of vascular plants – Aral kandym *Calligonum aralense,* southern reed *Phragmites australis* and Aral climacoptera -*Climacopera aralensis*. Land is flat. Sandy soil with mussels.

3.5. Eastern Berdah Section

Coordinates of key area: N 43.51.607, E 058.50.053

The area was set in the eastern part of Tokmakat Island. Vegetation is a set of mixed-grass-shrubby associations. The following varieties are noted in the association: sand acacia *Ammodendron conollyi*, yantak *Alhagi pseudalgahi*, silver sand acacia *Ammodendron argenteum*, *Ceratocarpus utriculosus*, *Salsola paulsenii,* harmala shrub *Peganum harmala*, *Astragalus ammodendron*, dried

whitesoil wormwood -*Artemisia terrae-albae*. Sand bindweed -*Convolvulus hamadae*, seepweed -*Suaeda salsa*, *Eremopyrum orientalis*, heliotrope *Heliotropium dasycarpum.* Elevated land, sandy soil.

Point 1. Coordinates: N 43.51.382, E 058.52.865

Relief of the described area is flat. Sandy soil with mussels. Here we noted mixed-grass-shrubby association. Edificator is *Haloxylon persicum.* Botanic composition: beaked sedge -*Carex physodes*, boyalish -*Salsola arbuscula,* sand acacia -*Ammodendron conollyi*, silver sand acacia *Ammodendron argenteum* (Fig. 16), *Eremopurum orientalis*, yantak -*Alhagi pseudalgahi*, keyreuk- *Salsola orientalis*, ragwort *Senecio subdentatus*, cibol *Allium sabulosum*, dried wormwood *Artemisia terrae- albae*.

Point 2. Coordinates: N 43.51.700, E 058.52.875

Desert sedge dominates on the surveyed area. Despite of the special role played by desert sedge in the life of plant communities of sand deserts of Turan, and only few of them allocate ilak formation. Beaked sedge – Carex physodes ammocolous rootstock ephemeroid, 15-25 cm high. It is an excellent fodder. The following varieties occur in the associations: *Ammodendron conollyi*, saxaul *Haloxylon persicum*, tamarisk - *Tamarix laxa*, *Tamarix hispida*, kandym - *Calligonum obtusum, Calligonum densum*, whitesoil wormwood- *Artemisia terrae-albae*, Paulsen saltwort *Salsola Paulsenii*, astragalus -*Astragalus ammodendron*, sand acacia *Ammodendron conollyi*, common ephedra *Ephedra distachya*, *Ceratocarpus utriculosus*, yantak *Alhagi pseudalgahi*, cibol *Allium sabilosum*, sand bindweed *Convolvulus hamadae*, *Eremopyrum orientalis*, ragwort *Senecio subdentatus,* keyreuk -*Salsola orientalis.* Irregular microrelief. Soil is sandy-clay. Multiple holes of small mammals are noted.

Fig. 16 *Ammodendron argenteum*

Point 3. Coordinates: N 43.52.566, E 058.53.071

Vegetation of the surveyed area is rarefied. Only 2 varieties are noted. Saltwort *Kalidium foliatum* prevails in recessions. *Ammodendron conollyi* occurs on elevated places. Land is non-smooth, soil is sandy, saline.

Point 4. Coordinates: N 43.52.787, E 058.53.150

Shrubby vegetation prevails on the surveyed area. Many indicators of sand desert are represented here. Projective cover 70-80%. Sand-acacia-kandym association is noted at this point. Botanic composition of the association consists of the following varieties: *Ammodendron conollyi*, silver sand acacia *Ammodendron argenteum*, boyalish -*Salsola arbuscula*, kandyms *Calligonum aralense, Calligonum obtusum, Calligonum densum*, *Astragalus ammodendron*, common ephedra *Ephedra*

distachya, horsetail ephedra *Ephedra equisetina*, sand bindweed *Convolvulus hamadae*, *Eremopurum orientalis*, beaked sedge *Carex physodes*, ragwort *Senecio subdentatus.*

Irregular microrelief. Sandy soil.

Point 5. Coordinates: N 43.53.342, E 058.53.091

Some brushwoods of white saxaul are noted at this point. Other varieties are absent. Residuals of last-year ephemers and ephemeroids occur under saxaul crowns. A wasteland of 4-5 ha is seen as well. Land is non-smooth, claypan soil. Sand storm was noted.

Point 6. Coordinates: N 43.51.628, E 058.52.072

Irregular microrelief. Sandy soil. Edificators of sand deserts are widespread on the described area. Here, as at the point 4, sand-acacia-kandym association is allocated. Botanic composition of the association consists of the following varieties: kandyms *Calligonum aralense, Calligonum obtusum, Calligonum densum*, *Ammodendron conollyi*, silver sand acacia *Ammodendron argenteum,* yantak - *Alhagi pseudalgahi*, cibol - *Allium sabilosum*, sand bindweed - *Convolvulus hamadae*, beaked sedge - *Carex physodes*, ragwort -*Senecio subdentatus*, *Schumannia karelinii*, whitesoil wormwood *Artemisia terrae-albae*.

Land is non-smooth. Soil is sandy. Multiple holes of small mammals are noted.

Point 7. Координаты N 43.50.665, E 058.53.664

Irregular microrelief. Sandy soil. Here we allocated mixed-grass-saxaul association. Projective cover of soil 50-60%. Young individuals of white saxaul exist. The following varieties are noted in the association: saxaul *Haloxylon persicum*, *Ceratocarpus utriculosus*, beaked sedge *Carex physodes*, cibol *Allium*

sabilosum, whitesoil wormwood *Artemisia terrae-albae*, harmala shrub *Peganum harmala*, ragwort-*Senecio subdentatus.*

Point 8. Coordinates: N 43.50.578, E 058.54.192

Vegetation is rarefied. White saxaul is dominant. Specific feature of this community is homogeneous distribution of beaked sedge . Here we noted wormwood-saxaul association. Botanic composition: saxaul -*Haloxylon persicum*, kandym -*Calligonum aralense, Calligonum obtusum, Calligonum densum,* harmala shrub -*Peganum harmala*, whitesoil wormwood *Artemisia terrae-albae*, beaked sedge -*Carex physodes, Eremopurum orientalis*.

Land is non-smooth. Soil is sandy.

Point 9. Coordinates: N 43.51.924, E 058.53.464

Irregular relief, hillocky sands. Normally, varieties of *Calligonum* dominate in such conditions in plant cover. Here we described mixed-grass-kandym association. The following varieties are noted in the community: kandyms-*Calligonum aralense, Calligonum obtusum*, *Ammodendron conollyi*, sand acacia серебристая *Ammodendron argenteum*, boyalish -*Salsola arbuscula, Ephedra distachya*, whitesoil wormwood- *Artemisia terrae-albae*, beaked sedge *Carex physodes*, yantak -*Alhagi pseudalgahi*, mat-grass *Stipa Richteriana*, seepweed-*Suaeda salsa*.

Holes of small mammals and many birds are noted.

Point 10. Coordinates: N 43.50.055, E 058.53.355

Soil of the surveyed area is sandy, Relief is non-smooth. Whitesoil wormwood prevails in the plant flora. Saxaul forms small brushwood in some places on more salinized areas. Botanic composition: saxaul *Haloxylon persicum,* whitesoil wormwood- *Artemisia terrae-albae*, Aral climacoptera *Climacoptera aralensis*, harmala shrub -*Peganum harmala*, keyreuk –*Salsola orientalis.*

Point 11. Coordinates: N 43.50.911, E 058.54.961

Bushes prevail. Edificator of the community is white saxaul. Projective cover is 70%. The following varieties are noted in the association: saxaul *Haloxylon persicum*, sand acacia *Ammodendron conollyi*, silver sand acacia *Ammodendron argenteum*, boyalish *Salsola arbuscula, Ephedra distachya* (Fig. 17), whitesoil wormwood *Artemisia terrae-albae*, kandym *Calligonum aralense*, beaked sedge *Carex physodes*, ragwort *Senecio subdentatus*, *Eremopurum orientalis*, *Ceratocarpus utriculosus*, cibol *Allium sabilosum.*

Relief is non-smooth, sandy hillocks. Holes of small mammals and many birds are noted.

Fig. 17 *Ephedra distachya*

Point 12. Coordinates: N 43.50.493, E 058.54.627

Relief is non-smooth. In some places there is a kind of basin. Rarefied vegetation. Plants don't occur in some places. Spreading wormwood *Artemisiadiffusa*, saxaul *Halohylon persicum*, beaked sedge - *Carex physodes*, *Eremopurum orientalis* are noted around the basin.

Point 13. Coordinates: N 43.50.525, E 058.54.926;

Point 14. Coordinates: N 43.49.622, E 058.54.812

Relief of described area is non-smooth. Dominant is white saxaul. The following varieties are noted in the association: saxaul *Haloxylon persicum,* whitesoil wormwood- *Artemisia terrae albae*, beaked sedge *Carex physodes*, *Eremopurum orientalis*, harmala shrub -*Peganum harmala*.

Point 15. Coordinates: N 43.49.612, E 058.56.486

On this area we noted a saxaul-wormwood association. High saxauls are noted – up to 4 m. Vegetation is rarefied. Only 3 varieties are registered in the plant cover: saxaul -*Haloxylon persicum,* whitesoil wormwood *Artemisia terrae-albae*, *Eremopurum orientalis*.

Irregular microrelief. Soil is sandy. There is a landfill area of fish-works of Muynak

Point 16. Coordinates: N 43.49.529, T 058.57.745

Mixed-grass-saxaul association is noted, where white saxaul dominates. Projective cover 50%. Following varieties are registered: saxaul -*Haloxylon persicum,* yantak *Alhagi pseudalgahi*, Paulsen saltwort -*Salsola paulsenii*, *Eremopurum orientalis,* whitesoil wormwood- *Artemisia terrae-albae*, harmala shrub - *Peganum harmala*. Termitaries occur (Fig. 18).

Point 17. Coordinates: N 43.50.459, E 058.57.887

Projective cover of this area – 0%. Dry residuals of *Kalidium capsicum* occur in some places.

Point 18. Coordinates: N 43.50.644, E 058.57.958.

Barkhan sands. Ammocolous plants dominate. Here we noted mixed-grass-shrubby association. The following varieties are noted in the association: saxaul - *Haloxylon persicum,* boyalish *Salsola arbuscula,* sand bindweed *Convolvulus hamadae*, *Schumannia karelinii*, Paulsen saltwort *Ephedra distachya*, kandyms *Calligonum aralense, Calligonum obtusum*, *Ammodendron conollyi*, beaked sedge *Carex physodes*, *Ceratocarpus utriculosus*, Paulsen saltwort *Salsola Paulsenii*.

Fig. 18. Termitaries

Point 19. Coordinates:N 43.49.434, E 058.57.807

Inter-barkhan basin. Soil is sandy, saline. Rarefied vegetation. 2 varieties of hyperhalophytes are noted – Caspian saltwort *Kalidium caspicum* и *Halostachys caspica*.

On the basis of the field studies, the Map of Vegetation of the surveyed areas had been made. 50 mapped units within 4 types of vegetation are identified on the map (see the attachment).

Conclusions

In the framework of the environmental audit of the Contract areas for the facilities of Uz-KorGas Chemical in accordance with the technical specification:

- Collection and analysis of literature data on the flora and vegetation of the Ustyurt Plateau, cliff and dried bottom of the Aral Sea existing as of today have been performed.
- Since very few precipitations have fallen in the winter-spring period (2010-2011) in Ustyurt, variety composition was relatively low diversified. This is mainly related to ephemers and ephemeroids characterizing fodder value of Ustyurt pastures.
- From the studied areas, relative rich plant diversity is noted at the Berdah Section, where 33 varieties of seed plants have been registered. Ajibay Section is characterized by the least number of varieties (13 varieties).
- Out of the four Red Book occurring on Ustyurt, the areal of *Malacocarpus crithmifolius* doesn't cover the Project area (they grow to the south of Karakalpak Ustyurt). Other varieties (Euphorbia sclerocyathhium, Climacoptera ptiloptera и Salsola chiwensis) have wider areal and possibly,

grow on the Project area. An example may be small number of *Salsola chiwensis* found during the expedition on the Project area.

Additional studies should be organized for identifying and assessment of current state of population of scarce species, taking into account the point of the last herbarium collections and phase of their development.

- One of optimum options of preservation of scarce species is sowing of their seeds or transplanting (perennial varieties) to the places with suitable environmental conditions outside the Project area.
- At the southern boundary of the Sudochye Lake (not far from the cliff), the recently described endemic variety *Allium usturtense* of Ustyurt was not found, that is possibly caused by unfavourable weather conditions of the year. Certainly, this narrow-area variety will be entered into the next published Red Book of Uzbekistan, and special attention should be paid to its population.
- It is necessary to define in details the dominating mechanisms of destruction of plant cover and transformation of soil surface due to technogenous impact.
- Some bare, plantless areas (Ajibay, Berdah areas) have been identified on the Contract area during the expedition), where fundamental reclamation of pastures are required by sowing the seeds of salt resisting and drought-resistant native species (Haloxylon persicum, varieties of Tamarix and Salsola).

RECOMMENDATIONS FOR MITIGATION OF ADVERSE ANTHROPOGENOUS IMPACT ON THE VEGETATION OF THE PROJECT AREA

The unique floristic complexes of the Project area are distinguish itself fragility and high level of vulnerability. Ecosystems of the Ustyurt Plateau and its cliffs are prone to easy destruction under impact of anthropogenous factors. The processes of rehabilitation protract to decades. Change of ecosystems of Aral Sea currently proceed on the way of degradation. Implementation of the projects for hydrocarbons production, construction of industrial enterprises and engineering services have adverse impact on the habitats of the plants of this region. Therefore, for minimization of such impact in the process of implementation of Project for Surgil, Northern and Eastern Berdah Fields, Construction of UGCC and Related Services, for preservation of natural complexes, the following general and special recommendations should be met:

- Reduction, and in some cases, elimination of adverse environmental impact is achieved by observance scientifically justified and regulatory design solutions.
- It is necessary to maximum combine the routes of motor roads, pipelines, power transmission lines and minimize the land areas allocated for industrial site.
- Reduction of the impact on the vegetation is achieved by prevention of accidents, which can cause discharge of liquid pollutants, as well as effective actions for localization and liquidation of accidents and their consequences. In droughty season, appearance of open flame should be avoided in the zone of location of industrial facilities in order to prevent fire.
- Arrangement of construction sites affecting scarce and endangered plant species should be avoided.

- Special attention should be paid to the places of growing of scarce and endemic plant varieties. If possible, transplant them to the places with suitable environmental conditions.
- For rehabilitation of plant communities after completion of pipeline construction on transformed areas, it is advisable to seed native species of plants.
- On degraded sections of the Ustyurt Plateau, land reclamation works are required with application of cutting moisture-accumulating furrows and strip tillage on claypans, takyr-like and light-clay soils.
- For reduction of adverse impact of Project implementation on the biological diversity of the Project area, it is advisable to provide monitoring both on the construction stage and in further period.

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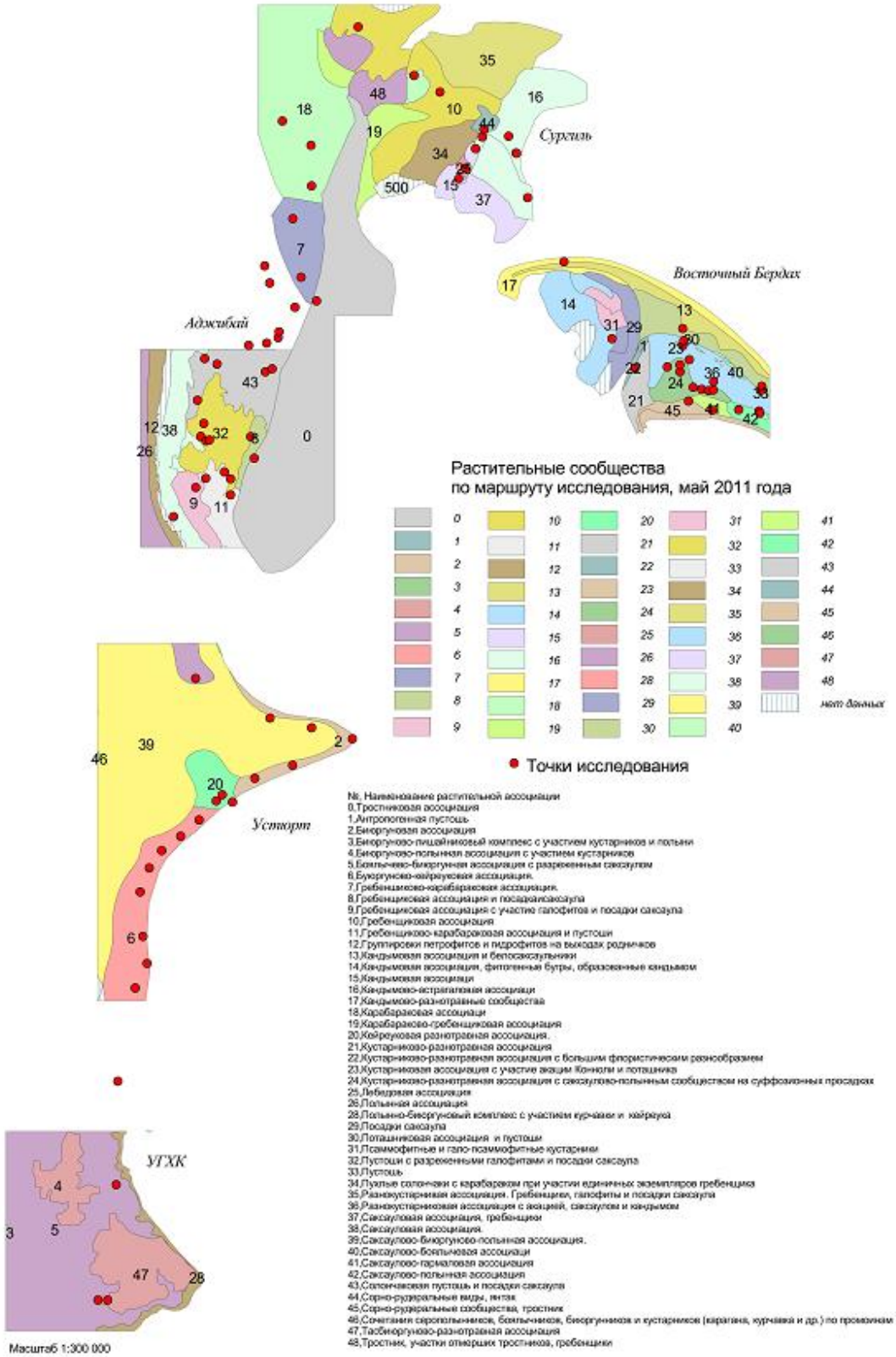
Attachment



Map of Vegetation of Key Areas of the Project Area

Appendix K. Ground Conditions Survey

K.1. Ground Conditions Survey

State Nature Protection Committee of the Republic of Karakalpakstan

State Specialized Inspection of Analytical Control

«AGRREED»
Chairman of State Nature Committee
_____P.Aitmuratov
«_____»_____2011г

«APPROVE»
Chairman of JV«UZ-KOR GAS CHEMICAL»
_____Kim Kwan Jin
«____»_____2011г

INFORMATION REPORT
Of sampling and testing executions for soils and water at UGCC site in Kungrad District and at "Surgil" gas field in Munak District

Leader of work
Chief SIAC: M.Jollibekov

Nukus 2011

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Introduction

General Information

In accordance with the requirements of the Nature Protection Regulations of the Republic of Uzbekistan and the Republic of Karakalpakstan, from the very beginning of its activity JV "Uz-KorGasChemical" is carrying out continuous environmental monitoring of the local environment on the site.

In 2011 based on the developed and agreed schedule the State Nature Protection Committee of the Republic of Karakalpakstan continuously carried out environmental monitoring on the site.

The aim of the environmental monitoring is to identify the initial environmental condition of the site where the UGCC is planned to be located and existing Surgil field, before the start of the activities of the JV "Uz-KorGasChemical".

Extraction of the ground water and testing of the quality of the water is to identify the quality of low water (concentration of the contamination) on the wells for extracting ground water on the Surgil field and Central CGTU.

Testing the samples of the surface evaporation is to identify concentration of contamination of the soil after evaporation, on the territories adjacent to the Surgil field. Research is aimed at potential windy territories, which may affect and cause risks to health of workers, working on the Surgil field and CGTU.

The primary purpose is to identify the level of contaminations in drilling fluids, which are disposed to the reservoirs on the existing drilling sites, and also to identify quality of the soil adjacent to the evaporation ponds.

Base on execution of Ecological monitoring

To follow for the requirements below mentioned are basis on execution of Ecological Monitoring:

1. Rules of the Republic of Uzbekistan and Karakalpakistan « About protection of nature», №754-XII dated on 09.12.1992 and 14.12.1992 y.

- *Article 29* «Tasks of ecological monitoring»
- *Article 32* «Departmental process public control in the area of nature protection»

According to environmental legislation of the Republics of Uzbekistan and Karakalpakistan, ecological monitoring (on the sites included in the contract) for current environmental conditions in "Surgil" field in Muynak district and initial environmental conditions at UGCC site in Kungrad district was held.

On May and June of 2011, according to the work schedule agreed and approved by state committee on nature protection of the Republic of Karakalpakistan, ecological monitoring (on the sites included in the contract) for current environmental conditions in "Surgil" field Muynak district and initial

environmental conditions at UGCC site in Kungrad district was held and final report was prepared on the base of executed monitoring results.

Purpose and tasks of environmental monitoring

Purpose of environmental monitoring is to make assessment of influence of "Surgil" field and UGCC Project on environment surroundings, and also to provide interested parties with reliable necessary information for prevention and reduction of adverse effect on environmental surrounding with the following items:

- Assessment of environmental surroundings in sites included in contract.
- To form precondition to identify measures to prevent creation of negative situations and possible damage to the surrounding environment.

Tasks of environmental monitoring are:

- observation of actual current environmental conditions in area include in contract.
- Promptly identification and forecast of natural and прогноз развития природных и anthropogenic processes which have influence on environmental condition in area included in contract.

Area of monitoring.

In area of Surgil field and UGCC the following controlling subjects are scope of work of environmental monitoring:

- Grounding water
- Soil

The environmental monitoring was conducted on the site, in accordance with the scope of work, identifying the current environmental situation of the site.

Characteristics of the natural-climatic conditions

The climate of the region is extremely continental. According to the information of Muynak meteo-station the hottest month is July. The average temperature in July is $+26^0$C, during some days may reach $+41^0$C. The coldest month is January with an average temperature -6^0C, and sometimes the temperature may drop to -27^0C.

Snow cover may remain from December to early May, the width is not more 50 cm, the rain season is in spring. The average annual precipitation is 94 mm. Minimal atmospheric pressure (750 mm of mercury) is in summer and maximal atmospheric pressure (769 mm of mercury) in winter. Winds are very frequent. Mostly these are north-eastern and eastern points of the compass (average speed 4-4,5 m/sec).

Soil. On Plato Ustyurt the soil consists of weakly developed loam, grizzled, poor with organic substances soil, with a strength of not more than 50 cm, on flatlands there are sierozemic, alluvial sandy loam of good quality, with strength of up to 2-2,5 m.

Ground water in the alluvial layers associated with sand band of alluvial-delta layers, water is infiltrated from Amudarya river and its flow path and irrigation channels. Insignificant increase of the reserves takes place as a result of inflow of salty water from the Miocene water complex located below. In the formation of alluvial band there are unbalanced clay bed, which divide the water complex into different water horizons, connected with each other hydraulically. A very weak flow of ground water towards west and north-west is result of gentle incline of the surface of the delta lowland. The depth of the water-table aquifer increases, as it goes further from the river Amudarya and irrigated lands.

ALLOCATING OF THE SYSTEM AND NETWORK OF OBSERVATION OVER THE STATE OF GROUND WATER ON THE TERRITORY OF SURGIL IN MUYNAK DISTRICT AND PIT IN AKCHOLAK SETTLEMENT IN KUNGRAD DISTRICT.

Taking samples of ground water on the field were carried from two artesian well at CGTU and also from 5 different plots at Surgil field, of which 2 existing plots and 3 new wells and 1 pit (N – 43.1899 E – 58.2793) in the Akcholak settlement in Kungrad district.

In accordance with the schedule of work defined ground water samples were taken at stations and observation points.

On environmental monitoring of ground water, water samples are taken from the defined monitoring points.

Sample takings were carried out in accordance with RH 68-02:2000 “a manual on taking samples of water samples and given layers on stations of quality monitoring of surface water of Aral Sea basin water”, Tashkent 2000.

Respectively with a Monitoring Program on the site of 8 observation points 8 selections of samples of ground water were made.

Performance of 240 identifications of measures of contaminants in the composition of ground water were carried out in accordance with the List of “Attested and temporarily accredited methods of carrying out of measuring MVI contaminants in the environment” Tashkent 2008.

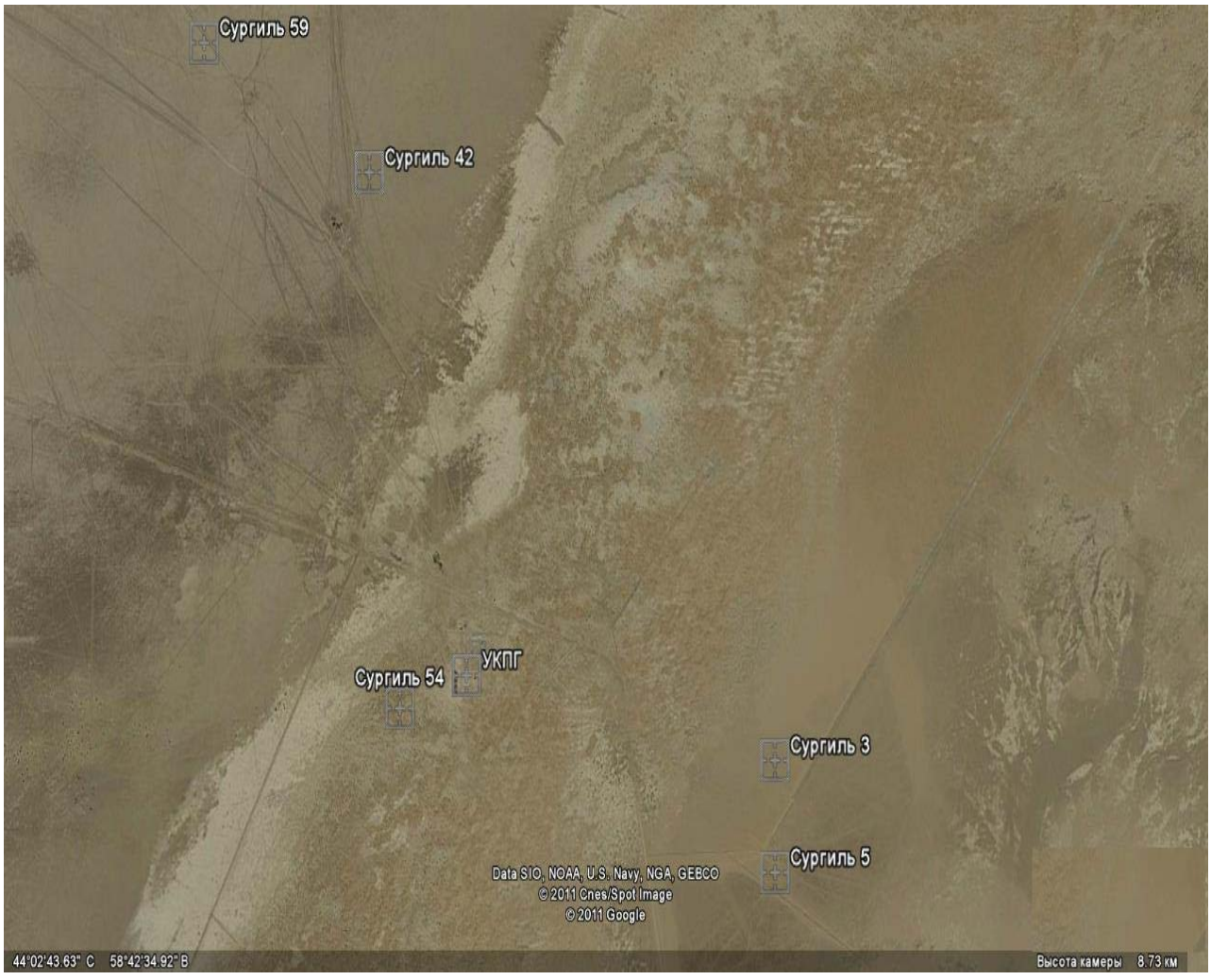
Assessment of quality composition of taken samples of ground water, had been carried out in accordance with regulative documents Oz DSt 950:2000 for 20 items of contaminants.

Well depth at sites of ground water samples in CGTU, Surgil field and UGCC in Akchalok settlement

№ п/п	Site	Sampling reference	Depth of wells
1	Abstraction well 1 CGTU	CGTU water -1	unknown
2	Abstraction well 2 CGTU	CGTU water-2	unknown
3	Surgil Gas well 3	Surgil water -1	LGW-0,55 m
4	Surgil Gas well 5	Surgil water -2	LGW -2,43 m
5	Surgil Gas well 42	Surgil water -3	LGW -3,5 m
6	Surgil Gas well 59	Surgil water -4	LGW -3,28 m
7	Surgil Gas well 54	Surgil water -5	LGW -2,80 m
8	Well in Akchalok settlement	well	LGW -31,0 m

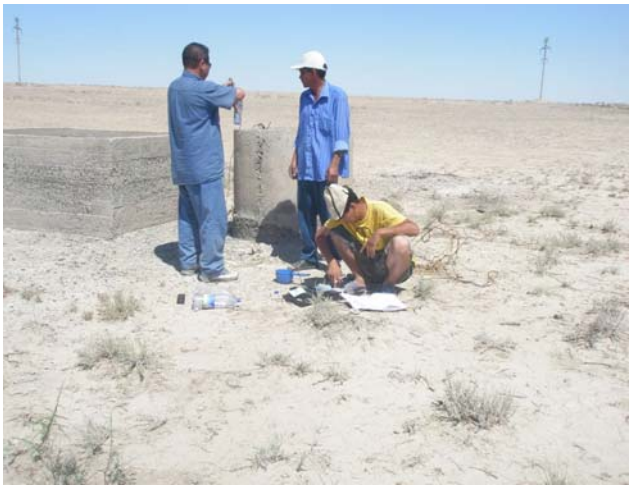
LGW-Level Ground Water

Scheme of Surgil fields in the Muynak district.



Pictures of sampling of ground water and testing in Surgil fields

Well in Akchalok settlement in Kungrad district.



ALLOCATION OF THE NETWORK AND ORGANIZATION OF OF SYSTEM OF OBSERVATIONS OF CONDITION OF THE SOIL AT PROJECT AREA OF UGCC IN KUNGRAD DISTRICT.

Environmental monitoring after the condition of the soil and subsoil on the territory of the Project was carried out on the project area of UGCC and the surrounding area of solid waste disposal and water reservoir of sewage water.

Selection of the points of sample taking was carried out under 4 development proposed to UGCC:

i. UGCC;
ii. Proposed place of solid waste area A (located to the North of UGCC);
iii. Proposed place of solid waste are B (located to the South of UGCC);
iv. Reservoir of sewage water

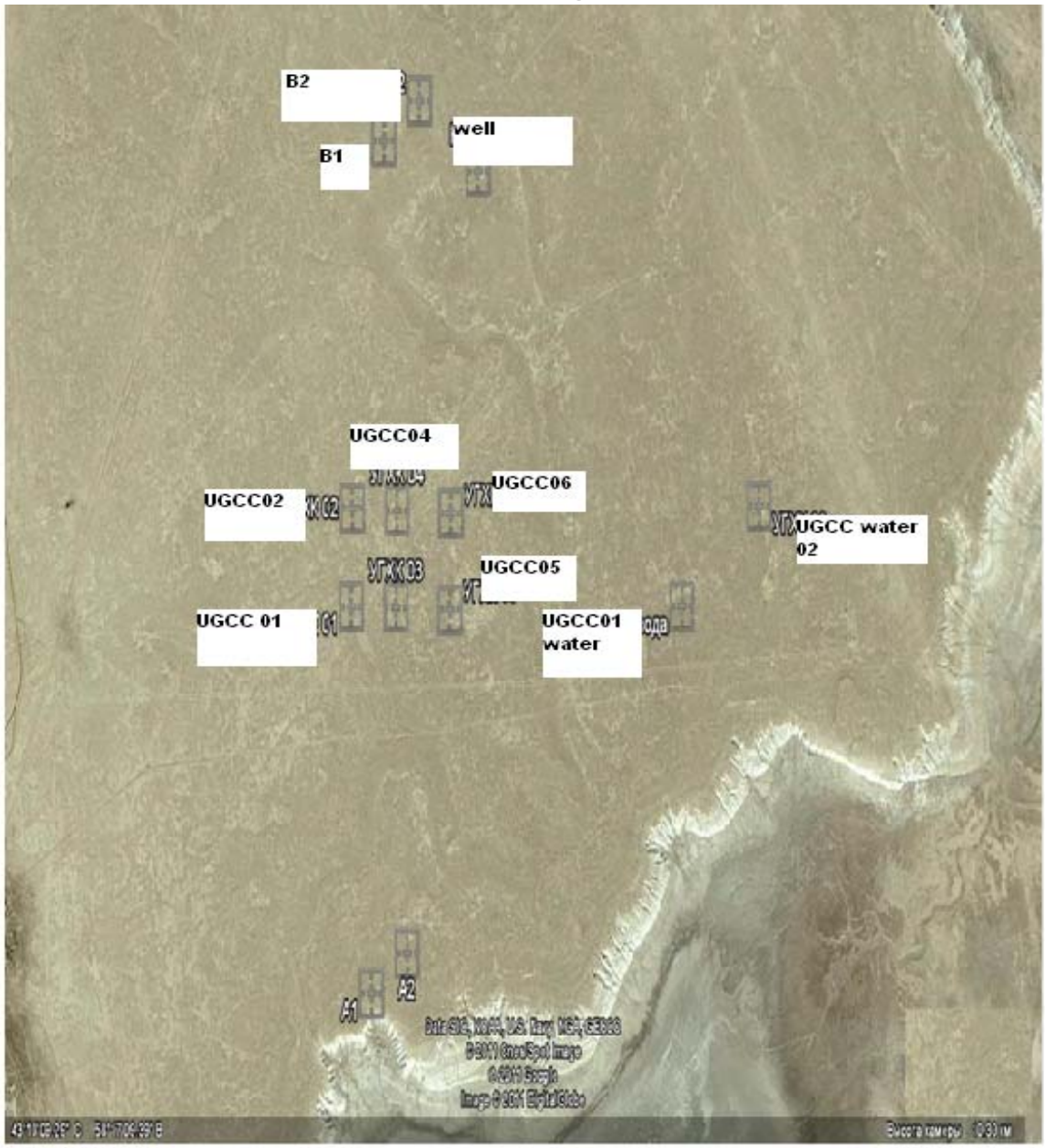
Selection of soils samples was carried out in accordance with GOST 98168-89 “Taking soil samples” based on the schedule of work on 12 observation points, 24 samples were taken and 19 components identification analysis was carried out.

Samples of soil were taken from the following layers on the territory of the site:

1) Upper level of the ground on the depth of 0.2-0.5m NUZ
2) Lower level of the ground on the depth of 1-1.5m NUZ

As a result of Physics and Chemical analysis of 24 samples of soil-ground, which were taken from 12 observation points, it was established that all the soil and ground of the site are exposed to salinity, with the level of salinity from low to high. This is identified by the micro and macro landscape of the territory and hydrogeological conditions and mechanical composition.

Location schemes of sampling points in UGCC project site in Akchalok settlement in Kungrad district



Site and coordination of sampling points of ground water in UGCC site

№ п/п	Reference to sampling point	Sampling reference	Sampling point	Location
1	UGCC	UGCC-01	Depth 0-0,2 m bgl	58.2617 43.1674
2		UGCC-01	Depth 1m bgl	58.2617 43.1674
3		UGCC-02	Depth 0-0,2 m bgl	58.2618 43.1725
4		UGCC-02	Depth 1m bgl	58.2618 43.1725
5		UGCC-03	Depth 0-0,2 m blg	58.268 43.1674
6		UGCC-03	Depth 1m blg	58.268 43.1674
7		UGCC-04	Depth 0-0,2 m bgl	58.2681 43.1724
8		UGCC-04	Depth 1m bgl	58.2681 43.1724
9		UGCC-05	Depth 0-0,2 m bgl	58.2756 43.1673
10		UGCC-05	Depth 1m bgl	58.2756 43.1673
11		UGCC-06	Depth 0-0,2 m bgl	58.2757 43.1723
12		UGCC-06	Depth 1m bgl	58.2757 43.1723
13	Solid Waste Disposal Site A	Solid Waste Disposal Site – A1	Depth 0-0,2 m bgl	58.2647 43.1474
14		Solid Waste Disposal Site– A1	Depth 1m blg	58.2647 43.1474
15		Solid Waste Disposal Site – A2	Depth 0-0,2 m bgl	58.2697 43.1495
16		Solid Waste Disposal Site A2	Depth 1m bgl	58.2697 43.1495
17	Solid Waste Disposal Site B	Solid Waste Disposal Site B1	Depth 0-0,2 m bgl	58.2661 43.1915
18		Solid Waste Disposal Site B1	Depth 1m blg	58.2661 43.1915
19		Solid Waste Disposal Site B2	Depth 0-0,2 m bgl	58.2711 43.1936
20		Solid Waste Disposal Site B2	Depth 1m bgl	58.2711 43.1936
21	Waste Water Pond	Water UGCC – 1	Depth 0-0,2 m bgl	58.3083 43.1676
22		Water UGCC -1	Depth 1m bgl	58.3083 43.1676
23		Water UGCC-2	Depth 0-0,2 m bgl	58.3192 43.1728
24		Water UGCC-2	Depth 1m bgl	58.3192 43.1728

Pictures and Morphologic description of sampling points

1. Reference to Sample UGCC-01

Date of sampling probe 07.06.11y

Coordination of sampling point N – 43.1674 E – 58.2617

1. Upper Layer of soil 0 - 1,5 m Blg
2. Lower layer of soil 1,0 - 1,5 m Blg

Morphologic description

0 – 7см	Light-grey, dry porous, very fine-grained clay sand , weak sealed, penetrated with local plant root, appreciable pass by color.
7 - 45см	Uncertain colour, dry, strongly sealed , cloddy, penetrated with local plant root.
45 – 100 см	Light-grey, dry, clay sand, penetrated with local plant root
ниже-100 см	White dry stone.

2. Reference to sample UGCC- 02

Date of sampling probe 07.06.11y

Coordination of sampling point: N – 43.1725E – 58.2618

1. Upper layer 0 – 1.5 m BGL
2. Lower layer 1.0 – 1.5 m BGL

Morphologic description

0-20cm	Grey-brown porous dry loamy soil, penetrated with plant root, cloddy structure appreciable pass by color.
20-60 cm	Yellow-wet, dry fine-grained sand, penetrated with local plant root.
60-100 cm	White hard dry stone
100-150 cm	Yellow fresh sandbank.

3. Reference to sample UGCC- 03

Date of sampling probe 07.06.11y

Coordination of sampling point: N – 43.1674 E – 58.2680

1. Upper layer: 0 – 1.5 m BGL
2. Lower layer: 1.0 – 1.5 m BGL

Morphologic description

0 – 10 cm	Porous dark-grey clay sand, penetrated by plant root, dry appreciable pass by color.
10 – 37 cm	Grey-brown dry, strongly sealed, ample penetrated by plant root, gradual pass.
37 – 63 cm	Yellow dry sand, strongly sealed, found small root, gradual pass.
63 – 70 cm	Dry hard gypsum, found small plant root
70 – 135 cm	Gypsum and stones below.

4. Reference to sample UGCC – 04

Date of sampling probe 07.06.11y

Coordination of sampling point: N – 43.1724 E – 58.2681
1. Topsoil: 0 – 1.5 m BGL
2. Lower layer: 1.0 – 1.5 m BGL

Morphologic description

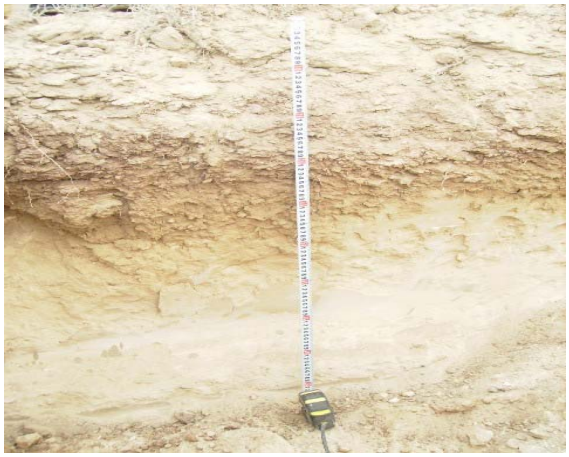
0-9cm	Thin light grey grain, dry porous, penetrated by plant root, different pass by color.
9-27cm	Gray-brown reddish, dry porous, weak sealed of general penetrated with small plant root, different pass by color
27-42cm	Ocherous dry carbonate efflorescence, found small plant root.
42-100 cm	Whitish-dark clay sand with small stone.
100-150 cm	White hard dry stone.

5. Reference to sample UGCC – 05

Date of sampling probe 07/06/11y

Coordination of sampling point N – 43.1673 E – 58.2756

1. Upper layer: 0 – 1.5 m BGL
2. Lower layer: 1.0 – 1.5 m BGL



Morphologic description

0-17cm	Porous dry granular sand. Penetrated with small plant root sharp pass by color.
17-50 cm	Gray-brown thin sand, dry, weak sealed, general penetrated with small plant root sharp pass.
50-100cm	Albescent medium granular sand, dry, strongly sealed
100cm and bellow	Lamellar albescent hard stone.

1. Reference to sample UGCC – 06

Date of sampling probe 07.06.11y

Coordination of sampling point N – 43.1723 E – 58.2757

1. Upper layer: 0 – 1.5 m BGL
2. Lower layer: 1.0 – 1.5 m BGL

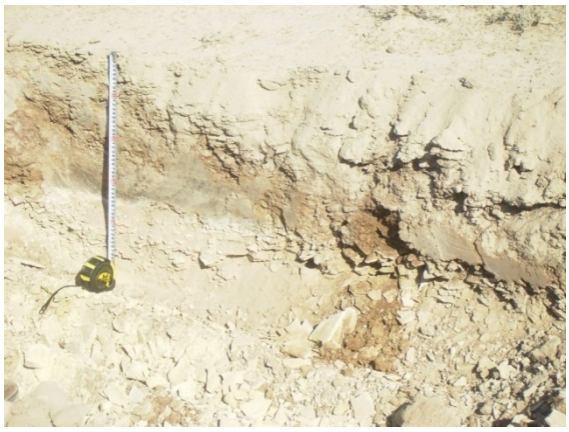
Morphologic description

0-27 cm	Gray-brown dark dry with efflorescence carbonates, strongly penetrated with plant root.
27-38 cm	Yellow gray dry thin granular sand, sealed, penetrated with small plant root.
38-70 cm	Whitish hard dry stone.

2. Reference to sample solid wastes – A1

Date of sampling probe 07.06.11y

Coordination of sampling point N – 43.1474 E – 58.2647
1. Upper layer: 0 – 1.5 m BGL
2. Lower layer: 1.0 – 1.5 m BGL



Morphologic description

0-8 cm	Light gray porous, weak sealed, dry, small, different pass by color.
8-35 cm	Brown, gray-dark, very strongly sealed, dry penetrated with plant root, different pass by color.
35-50 cm	Whitish-yellow, very strongly sealed.

3. Reference to sample solid wastes – A2

Date of sampling probe 07/06/11 y

Coordination of sampling point N – 43.1495 E – 58.2697

1. Upper layer: 0 – 1.5 m BGL
2. Lower layer: 1.0 – 1.5 m BGL

Morphologic description

0-20 cm	Red-dark gray, very dry, sealed with small pores, penetrated with plant root, sharp pass.
8-35 cm	Light-gray, dry, dense and porous, easily efflorescence, different pass by color.
35-50 cm	Yellow, very strongly sealed dry gypsum. Lamellar depth 1,0 – 1,5 cm

4. Reference to sample Solid wastes probe – B1

Date of sampling probe 07/06/11г

Coordination of sampling point N – 43.1915 E – 58.2661

1. Upper layer: 0 – 1.5 m BGL
2. Lower layer: 1.0 – 1.5 m BGL

Morphologic description

0-10 cm	Porous, dry, light, dark, plant pass by color.
10-30 cm	Gray brown, very sealed loam, dry, penetrated with plant root.
30-60 cm	Light gray clay sand with carbonates, penetrated with plant root, carbonate efflorescence.
60-100 cm	Whitish hard stone.

5. Reference to sample Solid waste probe – B2

Date of sampling probe 07/06/11г

Coordination of sampling point N – 43.1936 E – 58.2711

1. Upper layer: 0 – 1.5 m BGL
2. Lower layer: 1.0 – 1.5 m BGL

Morphologic description

0-10 cm	With small pores of dry wood (лесь)
10-50 cm	Red-dark, gray loam, penetrated with small plant root, horizontally lamellar, different pass by color.
50-125 cm	Horizontally lamellar, green whitish hard stone, dry.
125-150 cm	Whitish dry ??? (мест)
Below 150 cm	Whitish stone

6. Reference to sample UGCC water probe – 1

Date of sampling probe 07.06.11г

Coordination of sampling point N – 43.1676 E – 58.3083

1. Upper layer: 0 – 1.5 m BGL
2. Lower layer: 1.0 – 1.5 m BGL

Morphologic description

0-15 cm	Light gray, easy sealed wood
15-100 cm	Red-brown gray loam, very strongly sealed, dry, by location penetrated with plant root.
100-150 cm	Light yellow porous carbonate stone, dry.

1. Reference to sample UGCC water probe – 2

Date of sampling probe 07.06.11y

Coordination of sampling point N – 43.1728 E – 58.3192
1. Upper layer: 0 – 1.5 m BGL
2. Lower layer: 1.0 – 1.5 m BGL

Morphologic description

0-20 cm	Brown-dark, gray, very sealed, dry loams, by location found carbonate efflorescence.
20-40 cm	Yellow-gray, dry, small granular sand, easy sealed, sharp pass by color.
40-120 cm	Yellow-light, very sealed wood (лесь)
120-150 cm	Very hard whitish dry stone.

Sampling points of ground water in Surgil field.

№ п/п	Site	Sampling Reference	Depth of sampling
1.	CGTU	CGTU soil 1	0-0,2 m BGL
2.			1m BGL
3.	Surgil Gas Well3-5 metres from waste water pit	Surgil Soil 1A	0-0,2 m BGL
4.			1m BGL
5.	Surgil Gas Well 3-10 metres from well head	Surgil Soil 1B	0-0,2 m BGL
6.			1m BGL
7.	Surgil Gas Well 5-5 metres from waste water pit	Surgil Soil 2A	0-0,2 m BGL
8.			1m BGL
9.	Surgil Gas Well 5-10 metres from well head	Surgil Soil 2B	0-0,2 m BGL
10.			1m BGL
11.	Surgil Gas Well 42-5 metres from waste water pit	Surgil Soil 3A	0-0,2 m BGL
12.			1m BGL
13.	Surgil Gas Well 42-10 metres from well head	Surgil Soil 3B	0-0,2 m BGL
14.			1m BGL
15.	Surgil Gas Well 59-5 metres from waste water pit	Surgil Soil 4A	0-0,2 m BGL
16.			1m BGL
17.	Surgil Gas Well 59-10 metres from well head	Surgil Soil 4B	0-0,2 m BGL
18.			1m BGL
19.	Surgil Gas Well 5 metres from well head of Well Gas 54 in Suril field	Surgil soil 5	0-0,2 m BGL
20.			1m BGL

1. CGTU

Reference IGCC soil probe – 1
Sampling date 07.06.11y

- Upper layer at the depth from 0.2-0.5 m bgl;
- Lower layer at the depth 1 m bgl.

Morphologic description

0-20 cm	Strongly sealed, light-gray loam, dry, small cloddy composition.
20-50 cm	Dark –gray, fresh, strongly sealed, medium granular sand with seashell, sharp pass.
50-100 cm	Red-yellow, large grain layer quartz sand, dry.

2. Well Surgil 3

5 metres from waste water pit

Reference example Surgil soil 1A

Date of sampling 07.06.11y

- Topsoil at the depth between 0.2-0.5 metres bgl;
- Subsoil at the depth 1 metres bgl.

Morphological characteristic

0-20 sm	dark-grey medium-grained silica sand, dry, loose puddled in the lower part. Graceful change.
20 – 50 sm	Whitish-yellow fine-grained wet sand, faintly puddled with yellow medium-grained silica sand in some places.
50-100 sm	Whitish-yellow with shell rock silica sand, wet slightly puddled

3. Well Surgil 3

10 metres from wellhead

Reference example Surgil soil 1B

Sampling date 07.06.11y.

- Upper Layer at the depth between 0.2-0.5 metres bgl;
- Subsoil at the depth 1 metre bgl.

	Morphological characteristic
0-20 sm	Thin – grey puddled with inclusion of seashell и rust in 14 sm low color change.
20-30sm	Yellow with iron rust thin grained sand puddled wet medium-grained with evident change
50-100sm	Yellow-red wet medium-grained silica sand faintly puddled

4. Well Surgil 5

5 metres from waste water pit

Reference example Surgil soil 2A

Sampling date 07.06.11y

- Topsoil at the depth between 0.2-0.5 metres bgl;
- Subsoil at the depth 1 metre bgl.

	Morphological characteristic
	Flat around section saxaul crusted saline, crust 2-3mm, porous dry
0-20	Dark-grey slight, loam medium puddled without structure with evident change.
20-30	Dark-grey sandy loam heavily puddled, wet with detritus in some place and seashell licks carbonates with various changes
30-50	glaucous wet sandy loam heavily puddled with various changes.
50-82	Dark-yellow wet silica sand with plenty of rust.

5. Well Surgil 5
10 metres from wellhead
Reference example Surgil soil 2B
Sampling date 07.06.11y

- Upper layer at the depth between 0.2-0.5 metres bgl;
- Subsoil at the depth 1 metre bgl.

Morphological characteristic

On the whole of horizon dark-grey sandy loam very heavily puddled below 0.8 m with plenty of background anvils.

6. Well Surgil 42
5 metres from waste water pit
Reference example Surgil soil 3A
Sampling date 07.06.11г

- Topsoil at the depth between 0.2-0.5 metres bgl;
- Subsoil at the depth 1 metre bgl.

Morphological characteristic

0-20 см	Dark-grey heavily puddled loam non-structural fresh evident change
20 – 50 см	Dark-grey very heavily puddled loam, debris of detritus fresh abrupt changes
50 – 100 см	Dark-grey with tints of rust very heavily puddled

7. Well Surgil 42
10 metres from wellhead
Reference example Surgil soil 3B
Sampling date 07.06.11y

- Upper layer at the depth between 0.2-0.5 metres bgl;
- Subsoil at the depth 1 metre bgl.

Morphological characteristic

0-20 см	Crusted layered surfaces light-grey heavily puddle loam with abrupt changes on color.
20 – 50 см	Dark-grey loam very heavily puddled, licks carbonates (by way of testing) viscosous glaucous sandy loam.
50 – 100 см	glaucous sandy loam heavily puddled glaucous sandy loam heavily puddled in/10sm meet
100 – 150 см	Rot through residuals rates d 2-3 sm with roots. Glaucous loam very wet.

8. Well Surgil 59
5 metres from waste water pit
Reference example Surgil soil 4A
Sampling date 07.06.11y

- Topsoil at the depth between 0.2-0.5 metres bgl;
- Subsoil at the depth 1 metre bgl.

Morphological characteristic

0-20 sm	light – dark raw material loam very heavily puddled, fresh.
20-50sm	Dark-grey loam very heavily puddled. Wet.
50-100sm	Dark-grey loam very heavily puddled.
100-150sm	brightly- glaucous loam, wet puddled.

9. Well Surgil 59

10 metres from wellhead

Reference example Surgil soil 4B

Sampling date 07.06.11y

- Upper layer at the depth between 0.2-0.5 metres bgl;
- Subsoil at the depth 1 metre bgl.

Morphological characteristic

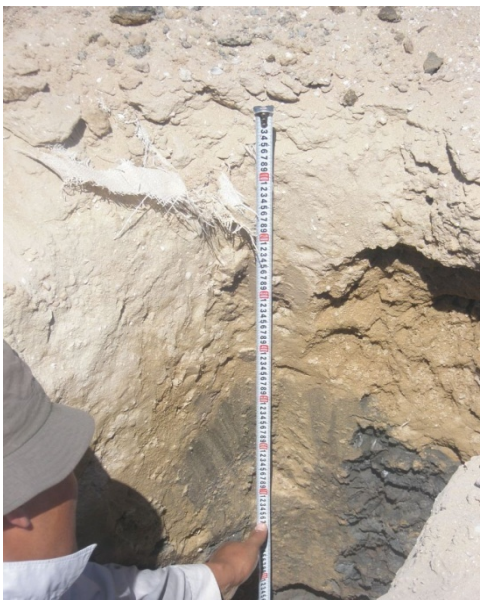
0-20 sm	Crusted layered surfaces light-grey heavily puddle loam with abrupt changes on color.
20 – 50 sm	Dark-grey loam very heavily puddled, licks carbonates (тестами) viscosous glaucous sandy loam.
50 – 100 sm	glaucous sandy loam heavily puddled
100 – 150 sm	glaucous sandy loam heavily puddled in/10sm meet Rot through residuals rates d 2-3 sm with roots. Glaucous loam very wet.

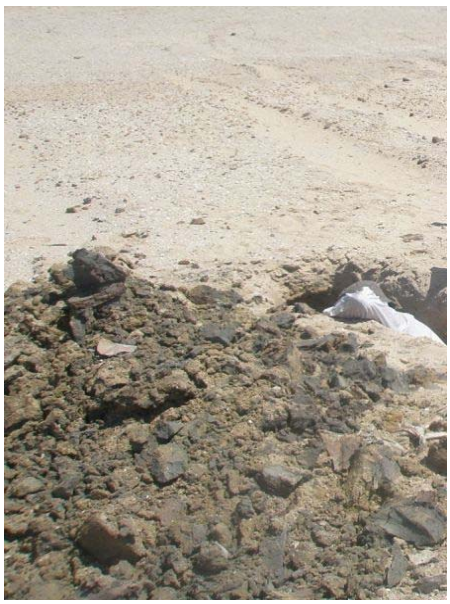
10. Within 5 metres from drilling fluids holding tank on the well 54 Gas field Surgil.

Reference example Surgil soil 5

Sampling date 07.06.11y

- Upper layer at the depth between 0.2-0.5 metres bgl;
- Subsoil at the depth 1 metre bgl.





Morphological characteristic

0-20 sm	yellow sand, dry with
20-100sm	background -rough gray.
Below 100sm	Wet loam with black color sand, smell of oil products

Results of Evaporate soil samples points

Evaporate Soil Sampling Points in CGTU area.

№	Site	Sampling Reference	Depth (m)BGL
1.	North -100 metres	ES -01	0,2
2.	North-500 metres	ES -02	0,2
3.	North -1000 metres	ES -03	0,2
4.	Northeast -100 metres	ES -04	0,2
5.	Northeast-500 metres	ES -05	0,2
6.	Northeast-1000 metres	ES -06	0,2
7.	South-100 metres	ES -07	0,2
8.	South-500 metres	ES -08	0,2
9.	South-1000 metres	ES -09	0,2
10.	Southeast-100 metres	ES -10	0,2
11.	Southeast-500 metres	ES -11	0,2
12.	Southeast-1000 metres	ES -12	0,2

Organization of laboratory examination on ground water.

Laboratorial examination of contaminated substances in water was held on the base of approved methods according to "List of certificated and timely accepted methods for contamination measurement in environmental area" Tashkent 2008 y

For the purposes of identification of the quality of the ground water highly sensitive equipment, with allowed accuracy range, was used

For photocolorimetric determination of water, the followings were used: photoelectric colorimetry PCC-2 and Spectrophotometer(Spekol–11). The measurements on pH, BOD and COD in water is held with volume titration methods.

The measurement of heavy metals was carried out by HACH's equipment.

Temperature, minerals and conductivities were measured with portable equipment conductometer of HACH firm.

Physico-chemical analysis of water was analyzed with gravimetric and titration methods by using analytical weight VLR-200.

The measurement of heavy metals (plumbum, nickel, sink, cadmium, arsenic, selenium) in ground water was executed by atomic absorption analysis with equipment AAC-6501.

Conductometer HACH

pH метр

Методы определения загрязняющих веществ грунтовых вод

Table №

№ п/п	**Measuring components**	**The existing methods**	**The applied methods , Guideline Document and Literature**
1	pH index	Combined electrode of the firm HACH for determination, react to	Method which uses the ion-selective electrode in the equipment of HACH for pH analyzing approved by state nature protection committee of the Republic of Uzbekistan
2	Mineralization	Gravity measurement method which is based on analyzing the	«Investigation methods for water quality in

		contents of minerals and organic substances in water at temperature 110 ^{0}C	water ponds' » Yu.V.Novikov
3	Chemical oxygen demand (COD)	The method is based on the oxidation of the existing substances in water with potassium permanganate in sulfuric acid medium with subsequently addition of potassium iodide, the liberated iodine (its amount is equivalent to the amount of unreacted potassium permanganate) is titrated with sodium thiosulfate.	MME(Method Measurement Execution) 147:2000
4	Biological oxygen demand (BOD)	The most method of among various methods for BOD determining is definition of oxygen content differences in dissolved oxygen content before and after incubation under standard conditions (at 200C under aerobic conditions, without access of air and light). In the BOD value, the oxygen flow rate for nitrification is not included	«Investigation methods for water quality in water ponds' » Yu.V.Novikov
5	Sulphate	The method is based on the precipitation of sulfate ions with barium chloride. The precipitation of barium sulfate is dissolved in a titrated solution of sodium acetate ethylendiamintetr (Trilon-B); the excess of precipitation is titrated with a solution of magnesium chloride.	MME 0458:2009
6	Phosphate	In a diluted phosphate solution, ammonium molybdate reacts with phosphate in an acidic medium to form molibdenophosphate acid, which is reduced with stannum until intense coloring of complex blue colour	«Investigation methods for water quality in water ponds' » Yu.V.Novikov

7	Chrome VI	Method for determination of chromium VI is based on measurements on light-absorbing in the wavelength range from 540 to 550 nm colored (red-purple) complex compound which is formed by the reaction of 1,5-diphenylcarbazide with bichromate ions in analyzing water samples in an acidic medium and determination of chromium (VI) by the value of the optical density of the solution.	MME 0522:2011
8	Copper	The method is based on measuring the optical density of stained yellow color of diehtylditiocarbamate copper, which is formed in an acidic medium (pH 1-1.5)by the reaction of diehtylditiocarbamate lead with copper ions in chloroform medium	MME 414:2009
9	Iron	The method is based on the reaction of iron ions with sulfosalicylic acid in an alkaline medium by forming colored yellow complex compound. The color intensity is proportional to the iron content.	Guidance document (GD) 118.3897485.9-92
10	Fluorine	The method is based on the abilities of fluoride ions in the forming colored blue triple complex compound with the rare earth elements and alizarin-complexone (1,2-dihydro-3-ksiontrahinolin methylamine NN-acetic acid),.	«Investigation methods for water quality in water ponds' » Yu.V.Novikov

11	Manganese	Methods for determination of manganese are based on its compound's oxidation to the MnO4-permanganate ion by ammonium persulphate or potassium with the presence of silver ions as the catalyst, in acidic medium. The intensity of pink color appearing is proportional to the amount of manganese.	«Investigation methods for water quality in water ponds' » Yu.V.Novikov
12	Total Hardness	The method is based on the formation of stable complex compounds of calcium and magnesium ions with sodium ethylenediaminetetraacetate (Trilon-B, Na2.EDTA) at pH 10.	«Investigation methods for water quality in water ponds' » Yu.V.Novikov
13	Potassium	The method is based on the complex calcium ion formation with the anion of EDTA medium at pH 12-13. In that medium, complex of magnesium ions is destroyed and calcium liberated in the form of hydroxide.	«Investigation methods for water quality in water ponds' » Yu.V.Novikov
14	Chlorides	The method is based on the titrimetric deposition of chlorides by silver nitrate with the presence of potassium chromate as indicator, in neutral or slightly alkaline medium. After the deposition of excess silver ions forms an orange-red precipitate of silver chromate.	«Investigation methods for water quality in water ponds' » Yu.V.Novikov

15	Magnesium	Magnesium, like calcium is existed in all surface and underground waters. Their concentrations depend on the geological conditions of the catchment area. For determination of magnesium content in the clean groundwater and most river water, calculation method can be applied on the base of results in determination of hardness and calcium.	«Investigation methods for water quality in water ponds' » Yu.V.Novikov
16	Carbonate Hardness	The method is based on the reaction of bicarbonate and carbonate ions with a strong acid by forming carbonic acid, which are broken down into CO_2 and H_2O.	«Investigation methods for water quality in water ponds' » Yu.V.Novikov
17	Nitrogen nitrites	The method is based on the abilities of nitrite ions in yielding intensely colored dioseformations with primary aromatic amines. In determining nitrogen nitrites, reaction with sulfanilic acid and alpha-naphthylamine (Griess reagent) is used by forming a pink color, the intensity of it is proportional to the nitrites content in the water.	MME 265:2005
18	Nitrogen nitrates	The method is based on the reaction between nitrates and phenolsulphate acid with formation of nitro derived phenol which with alkaline forms compounds, is colored in yellow color	GD 118.3897485.12-92
19	Ammonia nitrogen	The method is based on the abilities of ammonia (free ammonia and ammonium ions) in yellow colored compound of merkuammonia iodide with solution of iodide of mercury (I) in an alkaline medium	GD 118.3897485.16-92

20	Arsenic	Photometric measurement method is based on measuring the mass concentration of mercury in ground and waste water	«Методы исследования качества воды водоемов» Ю.В.Новиков. «Investigation methods for water quality in water ponds' » Yu.V.Novikov
21	Cadmium	Atomic absorption analysis of metals (aluminum, silver, алюминия, серебра, cadmium, chromium, copper, iron, magnesium, zinc, vanadium, cobalt, copper, nickel, plumbum) in ground water with having dry electrochemical atomization of samples	GD 52.24.377-95

Ground water samples on the site were taken from 8 points at the depth of 55 cm to 3,5 m.

The pH in the ground water fluctuated in the range of 7,0 to 10,0. The results of the carried out research show: Total and carbonate harnesses are fluctuated from 6.57 to 10,3 mg/l. Cation contents of calcium and magnesium in areas included in scope of work are not over than limitation. Groundwater is sulfate-chloride and chloride-sulfate types .

Check on content of heavy metals on the territory of Surgil field as well as UGCC were carried out. The results are presented in the tables below.

The content of organic compounds in ground water is detected in all sampling points. The content of organic compound on BOD in all sampling points is not higher than MPC, its average concentration is 2,01 mg/l of molecular oxygen. The content of organic substances on COD in all sampling points is higher than MPC, its average concentration is 132,2 mg/l (MPC is 4.4 mg/l) of molecular oxygen.

In ground water, everywhere the contents of biogenic elements are detected: ammonia nitrogen ,nitrogen nitrite, nitrogen nitrate and phosphate. Content of ammonia nitrogen is fluctuated from 0,01 to 0,61 mg/l; nitrogen nitrite is fluctuated form 0,02 to 0,63 mg/l; nitrogen nitrate is from 1,5 to 1,75 mg/l and phosphate's is 0,001 to 0,0025 mg/l

In ground water, at the field Surgil -1 at depth 55 cm, the highest content of nitrogen nitrite is 178,0 mg/l(MPC) the content of phosphate is not higher than MPC.

According to data of chemical analysis: content of cadmium in ground water is fluctuated from 0.002 to 0.101 mg/dm^3, it is only known that in CGTU-1 and CGTU 3 there are higher contents than MPC (MPC 0.001). Content of zink is fluctuated from 0.006 to 0.041 mg/dm^3 (MPC 3.0). Content of nickel in ground water is fluctuated from 0.099 to 0.404 mg/dm^3, it is only known that in CGTU-3, CGTU -5, CGTU-42, CGTU-59, and CGTU-54 and well there are higher contents than MPC (MPC 0.1). The contents of selenium is from 0,0047 to 0,0320 mg/ dm^3 and its concentration is higher in CGTU-1, Surgil-3, Surgil-5, Surgil-42 and Surgil-59 (MPC 0,01). The contents of arsenic is from 0,0004 to 0,004 mg/dm^3 (MPC 0,05). And potassium's is from 53,2 to 446,t mg/dm^3 recorded that

According to the results of environmental monitoring in area which is in scope of work, the contents of determining heavy metals is lower than MPC and do not have any existing influence on existing environmental conditions and man's impact

Results of Physic-Chemical analysis of mineral salts in ground water in the area of Surgil

Table №

№	Sampling point	pH	Component contents mg/l											
			Total hardness		Carbonate hardness		Calcium		Magnesium		Chloride		Sulfate	
			MPC	Fact	MPC	Fact	MPC	Fact	MPC	Fact	MPC	Fact	MPC	Fact
1	Abstraction well 1 CGTU	7,0	7	8,7	7	29,4	180,0	13,0	40,0	16,4	300	8032,5	100	474,15
2	Abstraction well 2 CGTU	7,5	7	8,55	7	33,4	180,0	10,4	40,0	23,0	300	7191	100	453,97
3	Surgil Gas well 3	10,0	7	10,7	7	37,5	180,0	28,1	40,0	9,4	300	32181	100	141,21
4	Surgil Gas well 5	7,5	7	8,44	7	26,3	180,0	8,9	40,0	17,4	300	7982	100	504,32
5	Surgil Gas well 42	8,5	7	6,57	7	19,4	180,0	4,0	40,0	15,4	300	5103	100	504,32
6	Surgil Gas well 59	8,0	7	7,86	7	28,0	180,0	5,1	40,0	22,9	300	6757	100	211,81
7	Surgil Gas well 54	7,5	7	8,83	7	29,8	180,0	7,2	40,0	22,6	300	7293	100	221,97
8	Well in Akchalok settlement	7,0	7	10,26	7	33,5	180,0	6,9	40,0	26,6	300	9435	100	121,04

Table №

The contents of organic substances in ground water.

№	Sampling point	Component contents mg/l			
		BOD		COD	
		MPC	Fact	MPC	Fact
1	Abstraction well 1 CGTU	6,0	1,4	30,0	144,4
2	Abstraction well 2 CGTU	6,0	2,8	30,0	150,1
3	Surgil Gas well 3	6,0	3,0	30,0	166,1
4	Surgil Gas well 5	6,0	3,4	30,0	178,0
5	Surgil Gas well 42	6,0	1,6	30,0	119,7
6	Surgil Gas well 59	6,0	1,5	30,0	133,9
7	Surgil Gas well 54	6,0	1,4	30,0	85,5
8	Well in Akchalok settlement	6,0	1,1	30,0	79,9

Content of biogenic elements in ground water

Table №

№	Sampling points	Component contents mg/l							
		Nitrogen nitrite		Nitrogen nitrate		Ammonia nitrogen		Phosphate	
		MPC	Fact	MPC	Fact	MPC	Fact	MPC	Fact
1	Abstraction well 1 CGTU	3,3	0,05	45	1,5	0,5	0,01	-	0,0015
2	Abstraction well 2 CGTU	3,3	0,25	45	1,75	0,5	0,37	-	0,0025
3	Surgil Gas well 3	3,3	0,045	45	1,75	0,5	0,61	-	0,0020
4	Surgil Gas well 5	3,3	0,018	45	1,55	0,5	0,48	-	0,0025
5	Surgil Gas well 42	3,3	0,02	45	1,75	0,5	0,08	-	0,004
6	Surgil Gas well 59	3,3	0,063	45	1,75	0,5	0,25	-	0,0032
7	Surgil Gas well 54	3,3	0,041	45	1,5	0,5	0,48	-	0,003
8	Well in Akchalok settlement	3,3	0,04	45	1,75	0,5	0,01	-	0,0010

Contents of Cr, Cu, Fe, B, F, Mn in groundwater

Table №

№	Sampling Point	Component contents mg/l											
		Cr		Cu		Fe		B		F		Mn	
		MPC	Fact	MPC	Fact	MPC	Fact	MPC	Fact	MPC	Fact	MPC	Fact
1	Abstraction well 1 CGTU	0,02	0,0017	1000	0,017	0,5	0,04	8,0	5,0	0,05	0,8	5,0	отс
2	Abstraction well 2 CGTU	0,02	0,002	1000	0,019	0,5	0,012	8,0	0,5	0,05	0,4	5,0	отс
3	Surgil Gas well 3	0,02	0,0011	1000	0,038	0,5	0,015	8,0	0,5	0,05	0,4	5,0	отс
4	Surgil Gas well 5	0,02	0,0016	1000	0,019	0,5	0,021	8,0	отс	0,05	0,4	5,0	1,0
5	Surgil Gas well 42	0,02	0,0017	1000	0,018	0,5	0,010	8,0	0,5	0,05	0,4	5,0	отс
6	Surgil Gas well 59	0,02	0,002	1000	0,012	0,5	0,08	8,0	отс	0,05	1,5	5,0	0,5
7	Surgil Gas well 54	0,02	0,0013	1000	0,020	0,5	0,001	8,0	отс	0,05	0,4	5,0	0,5
8	Well in Akchalok settlement	0,02	0,0011	1000	0,012	0,5	0,025	8,0	0,5	0,05	1,5	5,0	отс

Contents of Cd, Zn, Ni, Se, As, K in ground water

Table №

№	Место отбора проб	Component contents mg/dm^3											
		Cd		Zn		Ni		Se		As		K	
		MPC	Fact	MPC	Fact	MPC	Fact	MPC	Fact	MPC	Fact	MPC	Fact
1	Abstraction well 1 CGTU	0.001	0.017	3.0	0.011	0.1	0.099	0.01	0.0142	0.05	0.004	-	446.7
2	Abstraction well 2 CGTU	0.001	0.005	3.0	0.041	0.1	0.171	0.01	0.0047	0.05	0.0013	-	366.9
3	Surgil Gas well 3	0.001	0.101	3.0	0.011	0.1	0.404	0.01	0.0320	0.05	0.0031	-	276.6
4	Surgil Gas well 5	0.001	0.003	3.0	0.008	0.1	0.179	0.01	0.0116	0.05	0.0022	-	136.0
5	Surgil Gas well 42	0.001	0.004	3.0	0.026	0.1	0.148	0.01	0.0198	0.05	0.0018	-	86.6
6	Surgil Gas well 59	0.001	0.003	3.0	0.014	0.1	0.203	0.01	0.0120	0.05	0.0029	-	192.4
7	Surgil Gas well 54	0.001	0.003	3.0	0.006	0.1	0.367	0.01	0.0061	0.05	0.0026	-	146.5
8	Well in Akchalok settlement	0.001	0.002	3.0	0.015	0.1	0.222	0.01	0.0082	0.05	0.0004	-	53.2

Arrangement of laboratory analysis for the status of soil and subsoil

Analytical studies on determination of soil contamination were carried out in accordance with approved procedures, using appropriate laboratory equipment. Heavy metals - at the atomic - absorption spectrophotometer, oil products – on "Quantum-9M" equipment.

Quantum-9M *and Spectrophotometer DR/2000* Analytical investigations

Methods for determination of contaminants in soil and subsoil

Table №

Components to be defined	Method principle	Method name
Cation-anion composition of the aqueous extract (chlorides, sulfates, magnesium carbonate, the dry residue, pH)	The method consists of extracting water dissolving salts from the soil using distilled water at a ratio of soil to water equal to 1: 5	GOST 26423 -85 GOST 26428 -85 As to methods for determination if cation-anion composition of the aqueous extract
pH	Combined electrode for determination of pH of NASN firm responds to hydrogen ion concentration (activity), forming an electric potential on the boundary of the glass / liquid. At a constant temperature, this potential varies linearly with the change of pH of the sample solution. The electrode is free to diffuse connection, which eliminates problems of clogging. For more information, please refer to Appendix A, "The explanation of chemical processes."	HACH methods Spectrophotometer DR/2000
Electro conductivity	Electro Conductivity is the ability of ions to conduct electricity in solution. Electrical conductivity, by definition, is the reciprocal of resistance. Salt solutions of inorganic substances are conductors,	HACH methods Spectrophotometer DR/2000

	and the anions act as a current carriers (chlorides, nitrates, sulfides, phosphates) and cations (sodium, calcium, magnesium, iron, aluminum). Organic substances such as oils, phenols, alcohols, sugar do not conduct electricity and electric conductivity cannot act as the characteristics of their concentration. Electrical conductivity is determined by measuring the resistance of the liquid column, located between the sensor electrode surfaces. The electrodes immersed in the solution are applied with pair potential. The drop in potential due to the resistance of the solution used to calculate the conductivity per centimeter. The basic unit of measurement of electrical conductivity is the siemens or reciprocal cm. In the measurement with an aqueous solution it is better to use milliSiemens/cm (10-3 S) and microsiemens (10-6 S).	
Sulfates	Sulfate ions in the sample react with barium contained in the reagent SULFAVER 4, forming not soluble barium sulfate, the presence of which the solution becomes cloudy. The value of turbidity is proportional to the concentration of sulfate, see the description of chemical processes, for more information.	HACH methods Spectrophotometer DR/2000
Fluorine	The method is based on measuring the potential of ion-selective electrode based on the activity of fluoride ions.	WD 118.3897485.33-96 The method of measurement of mass fraction of water dissolving fluorine in soil samples by the potentiometer method.
Copper	The method is based on the photocolorimetric technique for determination of optical density of yellow colored solution, formed by the interactions of copper ions with diethyldithiocarbamate lead.	WD 118.3897485.30-96 The method of measurement of mass fraction of copper in soil samples using photocolorimetric method.
Copper	The method is based on the photocolorimetric technique for	WD 118.3897485.30-96 The method of measurement

	determination of optical density of yellow colored solution, formed by the interactions of copper ions with diethyldithiocarbamate lead.	of mass fraction of copper in soil samples using photocolorimetric method.
Nitrite	The method is based on the reduction of nitrite to nitrous oxide in the acidic environment and the use of iron sulphate. Iron ions are combined with nitric oxide to form a complex that has brownish-green color, in quantities directly proportional to the quantity of nitrite present in the sample. For more detail see "The chemistry of the process" in Annex A.	HACH methods Spectrophotometer DR/2000
Nitrate	Metal cadmium in the sample restores the nitrates to nitrites. Ion nitrite in mildly acidic medium reacts with sulfanilic acid to form an intermediate diazonium salt, which forms an acid with gentianic acid having a yellow color. See Annex "A", "The explanation of chemical processes", for more information	HACH methods Spectrophotometer DR/2000
Sulfides	Hydrogen sulfide and acid-soluble metal sulfides react with oxalate N, N-demethyl-n feniletilendiamine, forming methyl blue. The intensity of blue color is proportional to the concentration of sulfides. High levels of sulfides in the water near the oil fields can be determined after dilution.	HACH methods Spectrophotometer DR/2000
Manganese	In one laboratory using the same batch of reagents by one operator for analysis spectrometer DR/ 2000 standard deviation does not exceed + / - 0.06 mg/l of manganese in the sample is oxidized to permanganate ion and sodium periodate in a buffered medium lemon acid buffer. The color intensity is directly proportional to the concentration of manganese. If you need to determine the concentration of soluble manganese only, the precipitate must be filtered before adding acid.	HACH methods Spectrophotometer DR/2000
Cyanide	Pyridine - method used for analysis of cyanide, gives intense blue color with cyanide. In order to be able to analyze the transition cyanide and heavy metals bound	HACH methods Spectrophotometer DR/2000

	in complexes, necessary to carry out distillation.	
Potassium	Potassium in the sample reacts with the sodium tetraphenylborates, forming an insoluble white precipitate tetraphenylborates potassium. Turbidity of the solution in this case proportional to the concentration of potassium. More complete information is contained in Appendix A, "The chemistry of procedures.	
Iron	FerroVer- reagent for the determination of iron reacts with all the dissolved iron and the bulk of the insoluble forms of iron in the sample, forming a soluble ferrous ions. They in turn reacts to 1.10 phenanthroline indicator, giving the orange color of the solution, proportional to the concentration of iron. See Appendix A, "The chemistry of procedures" for more information..	HACH methods Spectrophotometer DR/2000
Chrome	Hexavalent chromium is determined by the 1,5 - difenilkarbogidrazidnym method using only dry powdered reagent CROMAVER 3 on the definition of chromium. This reagent contains a buffer in combination with 1,5 - diphenyl-karbogidrazidom that the reaction gives a purple color if the presence of chromium. See Appendix A (the explanation of chemical treatments)for more information.	OzRH 84.1.4:2000 Methods for implementation of measurements of mass fraction of chrome in soil samples by photocolorimetric method. HACH methods Spectrophotometer DR/2000
Oil products	The method is based on the extraction of oil from the soil and carbon tetrachloride with simultaneous purification of eluates on alumina in the column. Hydrocarbon concentration in the sample determined by fluorimetric method.	WD 118.3897485.13-92. Methodical instructions for determination of content of petrochemical products in soil, natural and waste water by way of fluorometry.
Heavy metals	The method of atomic - absorption analysis is based on the ability of metal atoms in the ground state to absorb certain wavelengths of light they emit to absorb. Resonance line are most often from a lamp with a full cathode made of a defined component.	WD 52.18.191-89. Methodical instructions. Methods for implementation of measurement of mass fraction of acid – soluble forms of metal (copper, lead, zinc, nickel, cadmium) by soil samples absorption method
Arsenic	The technique is based on the formation of molybdenum blue and stripping	OzRH 84.1.3:2000 The method of measurement

	element in the form of arsenic in the action of hydrogen on metallic zinc hydrochloric acid or sulfuric acid solution and photometry of colored solution.	of mass fraction of arsenic in soils photocolorimetric method
Mercury	Atomic Absorption spectrometry (AAS). Method is based on on the absorption of ultra-violet light gas atoms.	

The results of physico - chemical analysis of soil and subsoil in the project base in Kungrad area

The results of physico - chemical analysis of the selected soil and subsoil samples at UGCC Akchalak contracting area have detected that:

- pH value and conductivity of soils and subsoil in observation point (points) composes of 5.0-6.0 and 0,62-3,79, respectively;
- Sulphate content in soils observed is in the range of 11.5 to 1400 mg/kg. The maximum content of sulphate is fixed to 1400 mg / kg CGTU-01, the minimum content of sulfates detected at 11.5 mg / kg. Solid Waste - B 1 at a depth of 1m.
- Soil and subsoil in the Akchalak Contracted Area are characterized by nutrient content of nitrites and nitrates, nitrites in content ranging from 0.02 to 0.05 mg / kg, nitrate from 5.0 to 8.0 mg / kg at a depth of 0.2 m and 1.0 m.

It is detected the high contents of nitrite 0.05 mg/kg UGCC-06, the minimum content of 0.02 mg / kg UGCC-04, high levels of nitrate observed 8.0 mg/kg UGCC - 01, 04; 05 and solid Waste - B 2, the minimum nitrate 6.0 mg/kg indicated UGCC - 02, 05, and solid waste-A 1, A 2, B 1 at all points of observation.

At all points of the monitoring stations it is detected the content of chloride of 3.0 to 9.0 mg/kg in soils. High chloride content observed 9.0 mg / kg solid waste - A 1, the minimum content of 0.6 mg / kg at a depth of 0.2 m and 1.0 m.

- at certain points fixed observation point the content of cyanide in soils ranging from 0.001 to 0.6 mg / kg CGTU-1, Surgil-1 A, 1B, 3B and 5.
- at all monitoring stations recorded levels of heavy metals in soils and sediments: chromium VI, copper and iron. The content of chromium VI in the range of 0.2 to 2.7 mg / kg, copper from 0.05 to 4.7 mg / kg and iron from 5.0 to 8.0 mg / kg.

At all the observational points the content of the following components in soil within a wide ragnge is equal to: **lead** from 7.46 to 28.56; and **cadmium** from 1.61

to 1.00 mg / kg; **nickel** from 8.57 to 61.32 mg/kg; **zinc** 10.64 to 46.48; **arsenic** from 0.91 to 1.93 mg/kg; **mercury** 0.01 to 0.03 mg / kg.

The content of these heavy metals in all samples taken is significantly below the background values.

Relatively high content of **selenium** is detected in samples taken at some points mainly on the depth ranging from 0.51 to 1.16 mg / kg. Here the background level is significantly high.

Table №

The contents of pH, conductivity, sulphates, nitrites, nitrates, chlorides in soil and ground in UGCC site in Kungrad district.

№	Sampling Points	Depth	Component contents mg/l											
			pH		Conductivity		Sulphates		Nitrites		Nitrates		Chloride	
			MPC	Fact	MPC	Fact	MPC	Fact	MPC	Fact	MPC	Fact	MPC	Fact
1.	UGCC-01	0,2 m	6,5-8,5	6,0	–	0,95	–	250	–	0,039	130,0	8	–	3,5
		1m	6,5-8,5	5,0	–	2,55	–	1400	–	0,039	130,0	7	–	6,0
2.	UGCC-02	0,2 m	6,5-8,5	6,5	–	1,02	–	150	–	0,033	130,0	7	–	3,0
		1m	6,5-8,5	5,0	–	0,99	–	150	–	0,03	130,0	6	–	2,6
3.	UGCC-03	0,2 m	6,5-8,5	6,5	–	2,0	–	275	–	0,046	130,0	7	–	4,1
		1m	6,5-8,5	6,0	–	1,89	–	270	–	0,031	130,0	7	–	4,8
4.	UGCC-04	0,2 m	6,5-8,5	6,0	–	2,24	–	150	–	0,020	130,0	8	–	2,6
		1m	6,5-8,5	6,0	–	2,01	–	144	–	0,026	130,0	7	–	3,0
5.	UGCC-05	0,2 m	6,5-8,5	5,0	–	1,20	–	175	–	0,051	130,0	8	–	3,1
		1m	6,5-8,5	5,0	–	1,08	–	160	–	0,044	130,0	6	–	4,4
6.	UGCC-06	0,2 m	6,5-8,5	5,0	–	0,62	–	200	–	0,056	130,0	7	–	3,
		1m	6,5-8,5	5,0	–	0,90	–	220	–	0,047	130,0	7	–	3,5
7.	Solid waste Disposal Site – A1	0,2 m	6,5-8,5	6,0	–	3,79	–	1100	–	0,033	130,0	8	–	9,0
		1m	6,5-8,5	5,0	–	2,20	–	950	–	0,031	130,0	6	–	8,1
8.	Solid waste Disposal Site – A2	0,2 m	6,5-8,5	5,0	–	3,60	–	950	–	0,044	130,0	6	–	3,5
		1m	6,5-8,5	6,5	–	2,50	–	880	–	0,030	130,0	6	–	4,0
9.	Solid waste Disposal Site – B1	0,2 m	6,5-8,5	6,0	–	2,28	–	9,75	–	0,026	130,0	7	–	5,0
		1m	6,5-8,5	6,5	–	2,20	–	11,5	–	0,021	130,0	6	–	5,2

10.	Solid waste Disposal Site – B2	0,2 m	6,5-8,5	6,0	–	1,20	–	160	–	0,03	130,0	8	–	4,0
		1m	6,5-8,5	6,0	–	1,08	–	140	–	0,025	130,0	7	–	4,5
11.	UGCC water -1	0,2 m	6,5-8,5	5,0	–	1,07	–	175	–	0,026	130,0	7	–	3,5
		1m	6,5-8,5	5,5	–	1,20	–	160	–	0,020	130,0	7	–	4,0
12.	UGCC Water-2	0,2 m	6,5-8,5	6,5	–	3,50	–	170	–	0,030	130,0	6	–	5,0
		1m	6,5-8,5	6,0	–	2,20	–	140	–	0,024	130,0	5	–	4,7

The Contents of As, Hg, Se, PH cyanide and total concentration in soil and ground in the area UGCC field in Kungrad district.

№	Sampling Points	Depth	Component contents mg/l											
			As		Hg		Se		PH НП		Cyanide		Total concentration	
			MPC	Fact	MPC	Fact	MPC	Fact	MPC	Fact	MPC	Fact	MPC	Fact
1.	UGCC-01	0,2m	2,0	1,388	2,1	0,070	0,5	0,400	0,03	abs	–	abs	–	3
		1m	2,0	1,487	2,1	0,051	0,5	0,656	0,03	abs	–	0,028	–	5
2.	UGCC-02	0,2m	2,0	1,056	2,1	0,068	0,5	0,255	0,03	abs	–	abs	–	3
		1m	2,0	1,205	2,1	0,059	0,5	0,360	0,03	abs	–	0,001	–	6
3.	UGCC-03	0,2m	2,0	1,100	2,1	0,036	0,5	0,210	0,03	abs	–	0,002	–	6
		1m	2,0	1,146	2,1	0,039	0,5	0,059	0,03	abs	–	abs	–	7
4.	UGCC-04	0,2m	2,0	1,026	2,1	0,044	0,5	0,753	0,03	abs	–	abs	–	5
		1m	2,0	1,380	2,1	0,038	0,5	0,740	0,03	abs	–	abs	–	6
5.	UGCC-05	0,2m	2,0	1,454	2,1	0,051	0,5	0,252	0,03	abs	–	abs	–	6
		1m	2,0	1,031	2,1	0,050	0,5	0,214	0,03	abs	–	abs	–	6
6.	UGCC-06	0,2m	2,0	1,110	2,1	0,030	0,5	0,208	0,03	abs	–	abs	–	13
		1m	2,0	1,503	2,1	0,022	0,5	0,243	0,03	abs	–	abs	–	12
7.	Solid waste Disposal Site – A1	0,2m	2,0	1,627	2,1	0,019	0,5	0,372	0,03	abs	–	0,012	–	10
		1m	2,0	1,124	2,1	0,036	0,5	0,425	0,03	abs	–	0,002	–	12
8.	Solid waste Disposal Site – A2	0,2m	2,0	1,200	2,1	0,028	0,5	0,390	0,03	abs	–	abs	–	4
		1m	2,0	1,145	2,1	0,029	0,5	0,508	0,03	abs	–	abs	–	4
9.	Solid waste Disposal Site – B1	0,2m	2,0	0,807	2,1	0,035	0,5	0,807	0,03	abs	–	0,058	–	3
		1m	2,0	1,050	2,1	0,030	0,5	0,720	0,03	abs	–	abs	–	6
10.	Solid waste Disposal Site – B2	0,2m	2,0	1,180	2,1	0,033	0,5	0,645	0,03	abs	–	abs	–	6
		1m	2,0	1,510	2,1	0,029	0,5	1,191	0,03	abs	–	abs	–	7
11.	UGCC water-1	0,2m	2,0	1,927	2,1	0,034	0,5	1,164	0,03	abs	–	abs	–	5
		1m	2,0	1,320	2,1	0,020	0,5	0,970	0,03	abs	–	abs	–	8
12.	UGCC Water -2	0,2m	2,0	1,210	2,1	0,045	0,5	0,895	0,03	abs	–	abs	–	6
		1m	2,0	0,920	2,1	0,042	0,5	1,042	0,03	abs	–	0,001	–	6

Table №

The contents of Pb, Cd, Ni, Zn, Cr, Fe, Cu in soil-ground in UGCC site in Kungrad district

№	Sampling point	Depth	Component contents													
			Pb		Cd		Ni		Zn		Cr		Fe		Cu	
			MPC	Fact	MPC	Fact	MPC	Fact	MPC	Fact	MPC	Fact	MPC	Fact	MPC	Fact
1.	UGCC-01	0,2m	32,0	47,263	2,0	0,895	85,0	53,06	100,0	38,36	–	0,223	–	6,0	3,0	4,2
		1m	32,0	32,667	2,0	1,145	85,0	76,58	100,0	37,76	–	0,223	–	5,0	3,0	2,8
2.	UGCC-02	0,2m	32,0	11,135	2,0	0,765	85,0	66,50	100,0	21,98	–	0,156	–	7,2	3,0	3,0
		1m	32,0	25,845	2,0	1,201	85,0	75,04	100,0	4,340	–	0,133	–	6,1	3,0	2,8
3.	UGCC-03	0,2m	32,0	7,597	2,0	0,655	85,0	25,96	100,0	27,72	–	0,260	–	6,5	3,0	4,1
		1m	32,0	7,550	2,0	0,720	85,0	47,46	100,0	29,68	–	0,180	–	6,5	3,0	3,2
4.	UGCC-04	0,2m	32,0	10,186	2,0	1,227	85,0	63,42	100,0	35,14	–	0,178	–	7,0	3,0	3,2
		1m	32,0	21,349	2,0	1,333	85,0	46,34	100,0	33,04	–	0,210	–	5,0	3,0	4,0
5.	UGCC-05	0,2m	32,0	21,296	2,0	0,603	85,0	73,22	100,0	35,14	–	0,113	–	7,1	3,0	4,2
		1m	32,0	13,382	2,0	0,607	85,0	89,60	100,0	35,98	–	0,121	–	6,8	3,0	4,4
6.	UGCC-06	0,2m	32,0	14,50	2,0	0,494	85,0	85,96	100,0	28,00	–	0,267	–	7,0	3,0	4,8
		1m	32,0	14,505	2,0	0,496	85,0	79,24	100,0	29,12	–	0,244	–	7,1	3,0	4,1
7.	Solid waste Disposal Site –A1	0,2m	32,0	13,061	2,0	0,288	85,0	59,92	100,0	10,64	–	0,178	–	5,0	3,0	2,6
		1m	32,0	7,463	2,0	0,457	85,0	66,92	100,0	35,70	–	0,177	–	5,7	3,0	1,9
8.	Solid waste Disposal Site –A2	0,2m	32,0	28,561	2,0	1,00	85,0	61,32	100,0	38,22	–	0,211	–	7,1	3,0	4,6
		1m	32,0	10,028	2,0	0,862	85,0	49,00	100,0	28,56	–	0,130	–	6,4	3,0	4,4
9.	Solid waste Disposal Site –B1	0,2m	32,0	10,998	2,0	1,105	85,0	36,12	100,0	45,22	–	0,111	–	8,0	3,0	4,2
		1m	32,0	5,545	2,0	0,467	85,0	51,24	100,0	13,72	–	0,120	–	7,8	3,0	4,7
10.	Solid waste Disposal Site –B2	0,2m	32,0	25,591	2,0	0,540	85,0	25,66	100,0	46,48	–	0,181	–	5,1	3,0	3,3
		1m	32,0	13,83	2,0	1,610	85,0	85,66	100,0	17,50	–	0,112	–	6,0	3,0	4,1
11.	UGCC Water -1	0,2m	32,0	12,215	2,0	0,388	85,0	22,26	100,0	28,28	–	0,044	–	9,0	3,0	4,0
		1m	32,0	21,366	2,0	0,925	85,0	29,98	100,0	37,24	–	0,021	–	7,8	3,0	4,1
12.	UGCC Water-2	0,2m	32,0	9,818	2,0	0,625	85,0	12,37	100,0	14,28	–	0,03	–	9,0	3,0	0,05
		1m	32,0	8,922	2,0	0,390	85,0	13,62	100,0	18,06	–	0,041	–	9,2	3,0	0,058

The results of monitoring over the parameters of soil and subsoil state at the existing Surgil field

The results of the monitoring shows that the selected samples of soils and subsoil at a various points of Surgil field have the difference in the depth of the pH from 0.2 to 1.0 m slightly varies from 5.0 to 6.8, a similar situation with electrical conductivity from 40 to 83.

At certain points of observation points of Surgil field the high amounts of sulphate (from 6.5 to 1400 mg / kg) was revealed. Sulfate content in soil and subsoil is below the established standards.

In selected samples of soil and subsoil from the existing Surgil field, as for the content of nutrients over the observation period, only nitrites and nitrates were detected. The maximum concentration of nitrite was fixed 0.211 mg / kg Surgil 1B, minimum 0.006 mg / kg Surgil 4B. The maximum concentration of nitrate recorded 74.0 mg / kg Surgil 1 A, a minimum concentration of 6.0 mg / kg Surgil 2A, 2B in the depth of 0.2 to 1.0 m.

The chloride content in soils in the vicinity of the existing field at the points of observation Surgil not exceeds the established standards from 2.8 to 27.5 mg / kg.

The maximum concentration recorded at (27.5 mg / kg) Surgil 4 A at a depth of 0.2 m and minimum concentration (2.8 mg / kg) at a depth of 1.0 m.

The concentration of cyanide content in soil and subsoil of the existing Surgil field is at the level of established standards (0,002-0,044 mg / kg).

The table provides content of heavy metals in soil and subsoil in the area of existing Surgil field: chromium (VI), copper, iron, at a depth of 0.2 m to 1.0 m. The content in soils of pigs over the observation period varies widely from 8.58 to 32.41 mg / k.
Maximum concentration of lead is above 32.41 mg/kg at 1.0m were recorded at 5-10 meters from the wellhead.
Content of cadmium, nickel and zinc in soils and subsoil over the entire period of observation in the selected samples remained significantly below the background level

According to the results of monitoring, the maximum concentration of (Cr +6) chromium in soil is recorded at 0.831 mg/kg Surgil 5, and the minimum concentration recorded 0.133 mg / kg Surgil 1A. The maximum concentration of copper was fixed at 7.5 mg / kg Surgil 1A, the minimum concentration is fixed at 2.2 mg / kg Surgil 5. The maximum concentration of iron is fixed at 82.5 mg / kg Surgil 1A, the minimum concentration of fixed at 3.0 mg / kg Surgil 3B.

Table №

The Contents of pH, conductivity, sulphate, sulfides, nitrites, nitrates chlorides in soil in the area of Surgil field

№	Sampling Point	Depth	Component contents mg/l													
			pH		Conductivity		Sulphate		Sulfide		Nitrites		Nitrates		Chloride	
			MPC	Fact	MPC	Fact	MPC	Fact	MPC	Fact	MPC	Fact	MPC	Fact	MPC	Fact
1.	CGTU	0,2m	6,5-8,5	6,8	-	0,57	-	275	-	0,007	–	0,026	130,0	7	-	3,0
		1m	6,5-8,5	6,0	-	0,60	-	270	-	0,006	–	0,02	130,0	7	-	3,0
2.	Surgil Gas Well 3-5 metres from waste water pit	0,2m	6,5-8,5	5,0	-	0,53	-	150	-	0,003	–	0,019	130,0	5	-	2,0
		1m	6,5-8,5	5,0	-	0,86	-	150	-	0,013	–	0,023	130,0	7	-	4,0
3.	Surgil Gas Well 3-10 metres from well head	0,2m	6,5-8,5	5,0	-	0,40	-	150	-	0,003	–	0,211	130,0	6	-	4,0
		1m	6,5-8,5	5,0	-	0,60	-	150	-	0,004	–	0,22	130,0	7	-	3,5
4.	Surgil Gas Well 5-5 metres from waste water pit	0,2m	6,5-8,5	5,0	-	0,58	-	150	-	0,003	–	0,023	130,0	6	-	4,0
		1m	6,5-8,5	5,0	-	0,98	-	150	-	0,004	–	0,023	130,0	6	-	3,5
5.	Surgil Gas Well 5-10 metres from well head	0,2m	6,5-8,5	5,0	-	4,0	-	190	-	0,003	–	0,016	130,0	6	-	5,3
		1m	6,5-8,5	5,0	-	1,83	-	450	-	0,003	–	0,020	130,0	6	-	5,0
6.	Surgil Gas Well 42-5 metres from waste water pit	0,2m	6,5-8,5	5,0	-	5,21	-	1000	-	0,004	–	0,016	130,0	6	-	13,0
		1m	6,5-8,5	5,0	-	2,27	-	575	-	0,003	–	0,026	130,0	7	-	3,5
7.	Surgil Gas Well 42-10 metres from well head	0,2m	6,5-8,5	5,0	-	5,20	-	8,0	-	0,004	–	0,011	130,0	7	-	12,0
		1m	6,5-8,5	6,0	-	2,20	-	6,5	-	0,004	–	0,016	130,0	7	-	7,5
8.	Surgil Gas Well 59-5 metres from waste water pit	0,2m	6,5-8,5	5,0	-	8,26	-	1400	-	0,002	–	0,033	130,0	7	-	27,5
		1m	6,5-8,5	6,0	-	1,72	-	275	-	0,004	–	0,033	130,0	8	-	6,0
9.	Surgil Gas Well 59-10 metres from well head	0,2m	6,5-8,5	5,0	-	6,19	-	825	-	0,01	–	0,006	130,0	7	-	9,0
		1m	6,5-8,5	6,0	-	5,16	-	1150	-	0,002	–	0,029	130,0	7	-	11,0

10.	Within 5 meters of drilling fluid storage pond at Well 54 Surgil Gas field	0,2m	6,5-8,5	5,0	-	1,50	-	200	-	0,002	–	0,08	130,0	7	-	4,0
		1m	6,5-8,5	6,2	-	1,58	-	200	-	0,005	–	0,099	130,0	7	-	2,8

The Contents of As, Se, Cyanide in soil in the area of Surgil field

Table №

№	Sampling point	Depth	Component contents mg/l					
			As		Se		Cyanide	
			MPC	Fact	MPC	Fact	MPC	Fact
1.	УКПГ CGTU	0,2m	2,0	1,060	0,5	0,489	-	0,002
		1m	2,0	0,786	0,5	0,396	-	abs
2.	Surgil Gas Well3-5 metres from waste water pit	0,2m	2,0	0,851	0,5	1,463	-	abs
		1m	2,0	0,810	0,5	0,760	-	0,002
3.	Surgil Gas Well 3-10 metres from well head	0,2m	2,0	0,615	0,5	0,315	-	0,002
		1m	2,0	0,466	0,5	0,248	-	abs
4.	Surgil Gas Well 5-5 metres from waste water pit	0,2m	2,0	0,890	0,5	0,442	-	abs
		1m	2,0	0,721	0,5	0,420	-	abs
5.	Surgil Gas Well 5-10 metres from well head	0,2m	2,0	1,120	0,5	0,905	-	0,002
		1m	2,0	1,068	0,5	0,878	-	abs
6.	Surgil Gas Well 42-5 metres from waste water pit	0,2m	2,0	1,165	0,5	1,422	-	0,002
		1m	2,0	0,910	0,5	0,846	-	0,006
7.	Surgil Gas Well 42-10 metres from well head	0,2m	2,0	1,240	0,5	1,198	-	abs
		1m	2,0	0,984	0,5	1,177	-	abs
8.	Surgil Gas Well 59-5 metres from waste water pit	0,2m	2,0	1,123	0,5	0,587	-	0,002
		1m	2,0	0,862	0,5	0,506	-	abs
9.	Surgil Gas Well 59-10 metres from well head	0,2m	2,0	0,975	0,5	1,290	-	0,044
		1m	2,0	0,883	0,5	1,301	-	abs
10.	Within 5 meters of drilling fluid storage pond at Well 54 Surgil Gas field	0,2m	2,0	0,702	0,5	0,378	-	abs
		1m	2,0	0,680	0,5	0,335	-	abs

The Contents of Pb, Cd, Ni, Zn, Cr, Fe, Cu in soil in the area of Surgil field

Table №

№	Sampling points	Depth	Component contents mg/l													
			Pb		Cd		Ni		Zn		Cr		Fe		Cu	
			MPC	Fact	MPC	Fact	MPC	Fact	MPC	Fact	MPC	Fact	MPC	Fact	MPC	Fact
1.	CGTU	0,2m	32,0	8,584	2,0	0,371	85,0	2,656	100,0	1,960	6,0	0,156	-	4,0	3,0	3,2
		1m	32,0	9,958	2,0	0,454	85,0	9,944	100,0	9,66	6,0	0,120	-	4,0	3,0	4,0
2.	Surgil Gas Well3-5 metres from waste water pit	0,2m	32,0	9,679	2,0	0,495	85,0	2,146	100,0	0,560	6,0	0,133	-	82,5	3,0	3,2
		1m	32,0	11,11	2,0	0,523	85,0	2,324	100,0	1,400	6,0	0,178	-	36,0	3,0	7,5
3.	Surgil Gas Well 3-10 metres from well head	0,2m	32,0	24,10	2,0	0,622	85,0	0,884	100,0	1,120	6,0	0,156	-	23,0	3,0	2,6
		1m	32,0	18,41	2,0	0,491	85,0	1,508	100,0	2,520	6,0	0,150	-	36,0	3,0	3,5
4.	Surgil Gas Well 5-5 metres from waste water pit	0,2m	32,0	21,37	2,0	0,499	85,0	2,262	100,0	49,00	6,0	0,180	-	9,0	3,0	3,2
		1m	32,0	14,63	2,0	0,783	85,0	25,78	100,0	35,14	6,0	0,178	-	11,0	3,0	4,5
5.	Surgil Gas Well 5-10 metres from well head	0,2m	32,0	23,53	2,0	0,625	85,0	21,95	100,0	37,38	6,0	0,133	-	9,0	3,0	7,2
		1m	32,0	32,41	2,0	0,636	85,0	26,60	100,0	35,42	6,0	0,178	-	6,0	3,0	3,6
6.	Surgil Gas Well 42-5 metres from waste water pit	0,2m	32,0	17,40	2,0	0,489	85,0	22,15	100,0	47,60	6,0	0,178	-	9,0	3,0	7,2
		1m	32,0	26,45	2,0	0,825	85,0	21,58	100,0	59,08	6,0	0,223	-	4,0	3,0	2,8
7.	Surgil Gas Well 42-10 metres from well head	0,2m	32,0	39,84	2,0	1,656	85,0	19,25	100,0	39,62	6,0	0,280	-	5,0	3,0	4,6
		1m	32,0	23,65	2,0	0,972	85,0	31,09	100,0	67,90	6,0	0,200	-	3,0	3,0	3,4
8.	Surgil Gas Well 59-5 metres from waste water pit	0,2m	32,0	28,25	2,0	1,499	85,0	21,59	100,0	54,46	6,0	0,133	-	9,0	3,0	7,2
		1m	32,0	12,67	2,0	1,053	85,0	20,07	100,0	41,16	6,0	0,223	-	6,0	3,0	3,6
9.	Surgil Gas Well 59-10 metres from well head	0,2m	32,0	16,91	2,0	0,698	85,0	24,58	100,0	53,20	6,0	0,178	-	4,0	3,0	4,6
		1m	32,0	32,13	2,0	1,543	85,0	25,83	100,0	65,24	6,0	0,156	-	7,0	3,0	4,4
10	Within 5 meters of drilling fluid storage pond at Well 54 Surgil Gas field	0,2m	32,0	26,92	2,0	0,788	85,0	10,36	100,0	50,96	6,0	0,831	-	7,0	3,0	3,2
		1m	32,0	14,29	2,0	0,846	85,0	19,85	100,0	33,6	6,0	0,178	-	13,0	3,0	2,2

After evaporation near CGTU

The pH in soils and subsoil at the observation points is fixed between 5.0 and 6.0. The content of cyanide in separate points of monitoring stations ranged from 0.002 to 0.02 mg / kg.

Sulfates from 150 to 325 mg / kg. The high content is noted at 325 mg/kg at ES 12, ES 06 minimum. Chlorides from 1.4 to 3.0 mg / kg, copper 2.2 to 3.6 mg / kg, iron from 4.0 to 15.0 mg/kg at a depth of 0.2 m.

Concentrations of lead, cadmium, nickel, arsenic, zinc, aluminum and potassium at depths of 0.2 and 1 m does not exceed background values.

A relatively high level of selenium is recorded at a depth of 0.2 m to 1.46 mg/kg. The maximum value is recorded at Surgil well at 3-5m pit wastewater soil to a depth of 0.2-0.5 1A m 1.46 mg/kg.

The contents of pH, Sulphate, potassium, chlorides in soil after evaporation near CGTU

Table №

№	Sampling points	Depth	Component contents mg/l							
			pH		Sulphate		Potassium K		Chloride	
			MPC	Fact	MPC	Fact	MPC	Fact	MPC	Fact
1.	ES-01 north-100 metres	0,2	6,5-8,5	5,0	-	300	-	95,10	-	1,4
2.	ES-02 North-500 metres	0,2	6,5-8,5	6,0	-	225	-	102,9	-	1,4
3.	ES-03 North-1000 metres	0,2	6,5-8,5	6,0	-	225	-	277,9	-	3,0
4.	ES-04 Northeast-100 metres	0,2	6,5-8,5	6,0	-	175	-	299,4	-	2,0
5.	ES-05 Northeast-500 metres	0,2	6,5-8,5	6,0	-	160	-	204,6	-	2,0
6.	ES-06 Northeast-1000 metres	0,2	6,5-8,5	5,0	-	150	-	80,40	-	2,0
7.	ES-07 South-100 metres	0,2	6,5-8,5	5,0	-	275	-	139,8	-	2,5
8.	ES-08 South-500 metres	0,2	6,5-8,5	5,0	-	300	-	92,40	-	2,5
9.	ES-09 South-1000 metres	0,2	6,5-8,5	6,0	-	325	-	103,7	-	2,5
10.	ES-10 Southwest - 100 metres	0,2	6,5-8,5	5,0	-	225	-	74,65	-	4,5
11.	ES-01 Southwest-500 metres	0,2	6,5-8,5	5,0	-	250	-	51,50	-	3,0
12.	ES-12 Southwest-1000 metres	0,2	6,5-8,5	6,0	-	325	-	57,55	-	2,0

Table №

Contents of As, Se, TPH, cyanide in soil after evaporation near CGTU

№	Sampling points	Depth	Component contents mg/l							
			As		Se		TPH		cyanide	
			MPC	Fact	MPC	Fact	ФОН	Fact	MPC	Fact
1.	ES-01 North-100 metres	0,2	2,0	1,661	0,5	0,238	0,03	abs	-	abs
2.	ES-02 North-500 metres	0,2	2,0	1,245	0,5	0,296	0,03	abs	-	abs
3.	ES-03 North-1000 metres	0,2	2,0	1,236	0,5	0,489	0,03	abs	-	abs
4.	ES-04 Northeast-100 metres	0,2	2,0	1,280	0,5	0,532	0,03	abs	-	abs
5.	ES-05 Northeast-500 metres	0,2	2,0	1,379	0,5	0,950	0,03	abs	-	abs
6.	ES-06 Northeast-1000 metres	0,2	2,0	1,112	0,5	0,720	0,03	abs	-	abs
7.	ES-07 South-100 metres	0,2	2,0	0,815	0,5	0,894	0,03	abs	-	abs
8.	ES-08 South-500 metres	0,2	2,0	0,835	0,5	0,815	0,03	abs	-	abs
9.	ES-09 South-1000 metres	0,2	2,0	0,781	0,5	1,989	0,03	abs	-	abs
10.	ES-10 Southwest-100 metres	0,2	2,0	0,894	0,5	0,963	0,03	abs	-	0,002
11.	ES-01 Southwest-500 metres	0,2	2,0	1,822	0,5	1,084	0,03	abs	-	0,02
12.	ES-12 Southwest-1000 metres	0,2	2,0	1,205	0,5	0,834	0,03	abs	-	0,018

Table №

Contents of α-HCCH, γ-HCCH, DDE, DDT, Paratiometil, dimethoate, Malathion in ground after evaporation in CGTU area

№	Sampling points	Depth	Component contents															
			α-HCCH		γ-HCCH		DDE		ДДД		DDT		Paratiometil		Dimethoate		Malathion	
			MPC	Fact	MPC	Fact	MPC	Fact	MPC	Fact	MPC	Fact	MPC	Fact	MPC	Fact	MPC	Fact
1.	ES-01 North-100 metres	0,2	∑=0,1	сл	∑=0,1	н/о	∑=0,5	0,004	∑=0,5	0,010	∑=0,5	0,042	-	abs	1,15	abs	0,15	abs
2.	ES-02 North -500 metrs	0,2	∑=0,1	0,001	∑=0,1	н/о	∑=0,5	0,006	∑=0,5	0,025	∑=0,5	0,125	-	abs	1,15	abs	0,15	abs
3.	ES-03 North-1000 metres	0,2	∑=0,1	abs	∑=0,1	н/о	∑=0,5	0,002	∑=0,5	0,005	∑=0,5	0,008	-	abs	1,15	abs	0,15	abs
4.	ES-04 Northeast-100 metres	0,2	∑=0,1	0,001	∑=0,1	0,001	∑=0,5	0,035	∑=0,5	0,059	∑=0,5	1,213	-	abs	1,15	abs	0,15	abs
5.	ES-05 Northeast-500 metres	0,2	∑=0,1	0,001	∑=0,1	н/о	∑=0,5	0,010	∑=0,5	0,020	∑=0,5	0,177	-	abs	1,15	abs	0,15	abs
6.	ES-06 Northeast-1000 metres	0,2	∑=0,1	abs	∑=0,1	abs	∑=0,5	0,007	∑=0,5	0,043	∑=0,5	0,929	-	abs	1,15	abs	0,15	abs
7.	ES-07 South-100 metres	0,2	∑=0,1	сл	∑=0,1	сл	∑=0,5	сл	∑=0,5	сл	∑=0,5	0,02	-	abs	1,15	abs	0,15	abs
8.	ES-08 South -500 metres	0,2	∑=0,1	сл	∑=0,1	сл	∑=0,5	0,002	∑=0,5	0,006	∑=0,5	0,027	-	abs	1,15	abs	0,15	abs
9.	ES-09 South-1000 metres	0,2	∑=0,1	0,001	∑=0,1	abs	∑=0,5	0,002	∑=0,5	сл	∑=0,5	0,007	-	abs	1,15	abs	0,15	abs
10.	ES-10 Southwest-100 metres	0,2	∑=0,1	abs	∑=0,1	abs	∑=0,5	0,029	∑=0,5	0,013	∑=0,5	0,019	-	abs	1,15	abs	0,15	abs
11.	ES-01 Southwest-500 metres	0,2	∑=0,1	0,001	∑=0,1	0,001	∑=0,5	0,103	∑=0,5	0,196	∑=0,5	2,219	-	abs	1,15	abs	0,15	abs
12.	ES-12 Southwest-1000 metres	0,2	∑=0,1	0,001	∑=0,1	0,001	∑=0,5	0,004	∑=0,5	0,008	∑=0,5	0,062	-	abs	1,15	abs	0,15	abs

Note; DDT- dichloro-diphenyl-trichloroethane ,DDE- dichloro- diphenyl- trichloroethylene, HCCH- hexa-chloro-cyclo-hexane

Table №

The contents of Pb, Cd, Ni, Zn, Al, Fe, Cu in soil after evaporation near CGTU

№	Sampling Reference and Site	Depth	Component contents mg/l													
			Pb		Cd		Ni		Zn		Al		Fe		Cu	
			MPC	Fact	MPC	Fact	MPC	Fact	MPC	Fact	MPC	Fact	MPC	Fact	MPC	Fact
1.	ES-01 North-100 metres	0,2	32,0	11,35	2,0	0,521	85,0	2,576	100,0	14,42	-	5103,0	-	6,0	3,0	3,2
2.	ES-02 North-500 metres	0,2	32,0	10,14	2,0	0,423	85,0	2,230	100,0	14,82	-	6097,0	-	7,0	3,0	2,6
3.	ES-03 North-1000 metres	0,2	32,0	8,753	2,0	0,393	85,0	1,656	100,0	11,48	-	7938,0	-	4,0	3,0	3,0
4.	ES-04 Northeast -100 metres	0,2	32,0	26,73	2,0	1,027	85,0	2,976	100,0	18,20	-	8505,0	-	9,0	3,0	3,6
5.	ES-05 Northeast-500 metres	0,2	32,0	22,30	2,0	0,820	85,0	1,678	100,0	32,62	-	4941,0	-	7,0	3,0	3,0
6.	ES-06 Northeast-1000 metres	0,2	32,0	14,10	2,0	0,759	85,0	2,68	100,0	14,84	-	4535,0	-	5,0	3,0	3,0
7.	ES-07 South 100 metres	0,2	32,0	5,840	2,0	0,341	85,0	4,476	100,0	19,18	-	8019,0	-	7,0	3,0	3,0
8.	ES-08 South -500 metres	0,2	32,0	11,17	2,0	0,481	85,0	4,206	100,0	20,16	-	5913,0	-	9,0	3,0	3,0
9.	ES-09 South -1000 metres	0,2	32,0	7,534	2,0	0,460	85,0	3,176	100,0	33,46	-	8530,0	-	15,0	3,0	3,6
10.	ES-10 Southwest-100 metres	0,2	32,0	10,59	2,0	0,645	85,0	3,010	100,0	17,22	-	6642,0	-	10,0	3,0	2,2
11.	ES-01 Southwest 500metres	0,2	32,0	12,12	2,0	0,662	85,0	3,342	100,0	22,30	-	6244,0	-	7,0	3,0	2,6
12.	ES-12 Southwest-1000 metres	0,2	32,0	17,11	2,0	0,757	85,0	3,636	100,0	36,12	-	6723,0	-	6,0	3,0	2,6

CONCLUSION

1. According to the results of monitoring studies on ground water in areas included in the scope of works it may be noted that the contents of total and carbonate hardness, sulfates, chlorides, difficult oxidized organic compounds are higher than maximum permissible concentration (MPC). The content of other impurities determined in the groundwater is lower than MPC. However, some ingredients reach the level defined by the MPC. The higher contaminated ground water is recorded in Surgil.
2. In general, on the base of monitoring results it was observed that the contents of ground water have not directly anthropogenic influence except other cases.
3. Ground – soil, the contents of heavy metals in the area included in the scope of work are not higher than MPC. Only the content of Selenium has higher concentration than MPC in the area in the scope of work.
4. Contents of residues of organochlorine pesticides in all taken samples included in the scope of work do not exceed MPC.
5. In general, natural environment areas of the contract area with the exception of some points has not undergone any changes.

RECOMMENDATIONS FOR FURTHER RESEARCH ON THE SITE.

1. To preserve the natural environment conditions in the planed territory, the company should:
    - maintain cleanness in all areas
    - not contaminate the areas with domestic areas, constructional and industrial wastes
    - use only certain roads

2. To organize monitoring networks on-site of wells and waste disposal sites and to be required to place observation posts to cover all potential sources of contamination under limits.
3. For decision items about protection of natural environmental conditions in the area included in scope of work, to be necessary to submit State Committee On Nature Protection of the Republic of Uzbekistan and Karakalpakistan the action plan of protection of nature.
4. In the future, to be necessary to execute environmental assessment and expertise with including conservation arrangements and environmental monitoring systems, within planning and executing of works in oil-gas refinery fields.

Appendix L. Glossary of Acoustic Terms

L.1. Glossary of Acoustic Terms

Air Absorption	The reduction in sound level due to atmospheric effects
Ambient Noise	The total sound environment under a given set of circumstances
Annoyance	A sensation of irritability or displeasure
Attenuation	The reduction in sound pressure levels during transmission of sound
A-Weighting	A filter capable of mimicking the frequency response of the human ear at 40-phons
Baseline	The pre-existing noise conditions prior to the introduction of a noise source
Background Noise	This is defined as the L_{A90} of the residual noise. The combined noise in an environment minus the presence of a specific noise contribution under measurement
Broadband	A noise containing a wide range of frequencies
Character	Single or multiple distinctive features to a given noise such as tone, impulse or whines
Daytime	Defined as the hours 07:00 – 23:00
Decibel (dB)	Equal to one tenth of a Bel. Normally used to refer to sound pressure level, sound power level or sound intensity level
Decibel (dBA)	Equal to one tenth of a Bel. Used to refer to sound pressure level, sound power level or sound intensity level that has been A-weighted
Directivity	The directional characteristics of propagation from a noise source (as the emission characteristics may vary in intensity and frequency for different directions)
Dwelling	A permanently or seasonally occupied residence
Emission	Noise emitted by a source
Environmental Noise	Unwanted or harmful outdoor noise generated by natural or manmade activities
Far-field	An area in free space at a significantly greater distance from a given sound source than the linear dimensions of the source, where the sound pressure level follows the inverse-square law (a decrease of 6 dB per doubling of distance from the noise source). The sound particle velocity is also in phase with the sound pressure in this area
Frequency	The rate fluctuations that occur in a cyclical manner normally expressed as cycles per second in Hertz in the field of acoustics

Frequency Spectrum	The range of noise frequencies audible (or inaudible) to the human ear
Ground Absorption	Reduction in sound caused by the interaction of the sound wave and the ground
Harmonic	A frequency of repetitive configuration that is a multiple of the harmonic
Hertz	The unit of measurement for frequency, equal to cycles per second
Industrial Noise	A distinctive type of noise arising from sources of an industrial nature
Intermittent Noise	A noise level that suddenly and continuously reduces to background noise levels several times during the period of observation
L_{A90}	The A-weighted level of noise exceeded for 90% of the measurement time. Normally taken as the background noise level
L_{Aeq}	A-weighted equivalent sound pressure level. A steady sound level that produces the same energy as the fluctuating sound level over the measured time interval
L_{Amax}	Maximum A-weighted sound pressure level occurring over the measured time interval
L_{eq}	The equivalent sound pressure level
L_{90}	The un-weighted level of noise exceeded for 90% of the measured time interval
Level	A term used to describe sound that has been converted into decibels
Low Frequency Noise	Noise generally in the frequency range of 20 Hz to 200 Hz
Measurement Interval	The period over which a noise measurement is made
Near-field	The part of a sound field, typically within two wavelengths of a noise source, where a simple relationship between sound level and distance does not exist, where sound pressure does not follow the inverse square law and particle velocity is not in phase with the sound pressure.
Night-time	Defined as the hours 23:00 – 07:00 in the United Kingdom
Noise	A sound that can be described as being unnecessary or unwanted
Noise Sensitive Receptor	Any dwelling house, hotel, hospital, educational establishment, or any other place of high amenity that requires the absence of noise at nuisance levels for proper use
Noise Nuisance	Noise that interferes with the internal or external amenity of a property, for example
Octave	The range between two frequencies with a ratio of 2:1

Octave Band	Components of the frequency spectrum contained within two frequencies one octave apart
Rating Level	The specific noise level plus any adjustment for characteristic features
Receiver	An individual or property in receipt of noise
Residual Noise	The remaining ambient noise when a particular source of sound is suppressed to a degree that it does not contribute to the ambient noise
Screening	An environmental or man-made barrier between noise source and receiver that interrupts the transmission path, reducing the received noise levels
Sound	A sound is any form of disturbance that is transmitted in a flexible medium such as gas, liquid or a solid which causes pressure changes in the ear
Sound Level Meter	The instrumentation used to measure noise with a standardised frequency and exponential time weighting. There are many types used to measure various descriptions of sound. The measurement should be capable of accuracy and repeatability
Sound Power	The rate of production of noise energy and is independent of environmental influences
Sound Power Level	Ten times the logarithm to the base 10 of the ratio of the source sound power, W, to a standard reference power, W_{ref}, of standardised value, 1 picowatt
Sound Pressure	The increase or decrease in the atmospheric pressure caused by a sound wave. It is dependent on both the sound power of the source and the surrounding acoustic features in the environment surrounding both source and receiver
Sound Pressure Level	Ten times the logarithm to the base 10 of the square of the ratio of the effective or root mean square of the sound pressure fluctuations, P, and a standard reference pressure, P_{ref}, of 20 micropascals
Specific Noise Level	The equivalent continuous A-weighted sound pressure level at the assessment position produced by the specific noise source over a given measurement time interval
Specific Noise Source	The noise source under investigation for assessing likelihood of complaint
Third Octave	A frequency band where the frequencies have a ratio of 2 to the $1/3^{rd}$ power
Tone	The acoustic energy at a particular frequency or within a narrow frequency band
Tonal	The acoustic energy in a narrow frequency

Appendix M. Consultation Records

M.1. Consultation Letters

DECISION
of Mayor of Kungrat District
of the Republic of Karakalpakstan

Ref. No 118/ 3
Date 4 March, 2009

Concerning land allotment on the territory of Kungrat *forests and hunting division of Kungrat district for the purpose of construction of Ustyurt Gas Chemical Complex, town for operational staff and providing automobile and motor roads, railroads, power supply networks, water supply lines for Joint Venture "UzKorGasChemical" Limited Liability Company*

After reviewing the documents submitted from Permanent committee for land allotment, arranging, and preparing it for construction activities and in accordance with article 5 of Provision of "Concerning Land" of the Republic of Karakalpakstan regarding land allotment on the territory of Kungrat *forests and hunting division* of Kungrat district for the purpose of construction of Ustyurt Gas Chemical Complex, moreover town for operational staff and providing automobile and motor roads, railroads, power supply networks, water supply lines for Joint Venture "UzKorGasChemical" Limited Liability Company

Mayor of Kungrat District hereunder

ADOPTS A DECISION:

1. To confirm certificate-act dated 3rd March, 2009 issued by district commission, commission with regard to have appropriated and allotted land area on the territory of Kungrat forests and hunting division of Kungrat district in appropriate with the following dimensions for the construction works of Joint Venture "UzKorGasChemical" Limited Liability Company.

S/q No	Facilities name	Length, meter	Width, meter	Total area, hectare	Including:		
					Other areas, hectare	For temporary usage purposes, hectare	For permanent usage purposes, hectare
1	**Ustyurt gas chemical complex**	**980**	**867**	**85,0**	**85,0**	**-**	**85,0**
2	**Town for operational staff**	**1000**	**700**	**70,0**	**70,0**	**-**	**70,0**
3	**Rail road network**	**7000**	**21**	**14,7**	**14,7**	**-**	**14,7**
4	**Automobile and motor road**	**5000**	**18**	**9,0**	**9,0**	**-**	**9,0**

5	**Power supply network**	**10 000**	**10000/50* 10m2**	**0,2**	**0,2**	**-**	**0,2**
6	**Water supply line**	**5000**	**23**	**11,5**	**11,5**	**11,5**	**-**
	Total			**190,4**	**190,4**	**11,5**	**178,9**

2. Chief Architect of District (Sh.Seydullayev) should provide execution an coordination of Tasks for Architecture Planning (TAP) for the construction of Ustyurt Gas Chemical Complex, moreover town for operational staff and providing automobile and motor roads, railroads, power supply networks, water supply lines in accordance with present decision.

3. Land resources division of district in assistance with cadastre department of country (M.Jabbarbergenov) must assign appropriate amendments and corrections into land determination calculations as per present decision.

4. To submit request Council of Ministers of the Republic of Karakalpakstan for approval.

Mayor of Kungrat District **O. Nurimbetov**

RESOLUTION
of Cabinet of Ministers of
Republic of Karakalpakstan

Nukus city
Ref. No: 44/4
Date: April 2, 2009

"Concerning land allotment issues of companies, state authorities, organizations, economic entities concerning for the construction of houses, buildings, facilities "

In accordance with items No 20, 23 of "Land Code" of the Republic of Uzbekistan and items No 19,45 of Provision "Regarding the land " of the Republic of Karakalpakstan and moreover after reviewing all summarized documents that submitted by Karakalpakstan branch of "Uzdavyerloyiha" land design institute, Cabinet of Ministry of Republic of Karakalpakstan

D E C I D E S T H A T:

1. To approve the following specified **Decisions** issued by appropriate administrative mayors (hakim) related to land allotment for use of companies, state authorities, organizations, economic entities concerning the construction of houses, buildings, facilities:
   Decision No 574/12 dated 23 December 2008 issued by Nukus district mayor;
   Decision No 106/3 dated 6 March 2009 issued by Hojeyli district mayor;
   Decision No 118/3 dated 4 March 2009 issued by Kungrat district mayor.
2. For attention Land resources department and governmental land cadastre department of Republic of Karakalpakstan and also local administrative authority - to make amendments to appropriate land accounting.
3. To assign a person from the division of Agriculture and Water resources matters of the Cabinet of Ministry of republic of Karakalpakstan (Muhanov), Ministry of Agriculture and Water resources (Ermanov), as a liable for the execution of present decision and performing all necessary activities.

Cabinet of Ministry of
Republic of Karakalpakstan **B.Yangibayev**

Translation:

CONCLUSION

On land allotment, submitted by Kungrat district Kungrat land resources and city construction-planning department of Ministry of Agriculture and Water resources of Cabinet of Ministry of Republic of Karakalpakstan, Land resources department and governmental land cadastre division of Republic of Karakalpakstan, for the purpose of construction of gas chemical complex and providing all necessary engineering communications, service utilities, power supply networks, for Joint Venture "UzKorGasChemical " Limited Liability Company

Nukus city 18 March 2009

State Unitary company of land allotment and property cadastre division of the Republic of Karakalpakstan, with referring to letter No 67 dated 20th February 2008, hereby assumes that all submitted documents in order to land allotment for the favor of Joint Venture "UzKorGasChemical " Limited Liability Company have reviewed and complies with the item No 19 of Provision on "Land Allotment" of Republic of Karakalpakstan.

With reply to the letter together with act dated 3rd March 2009 issued by district commission, commission have appropriated and allotted land area under the following dimensions for the construction works of Joint Venture "UzKorGasChemical" Limited Liability Company.

S/q No	Facilities name	Length, meter	Width, meter	Total area, hectare	Including:		
					Other areas, hec.	For temporary usage purposes, hec.	For permanent usage purposes, hec.
1	**Ustyurt gas chemical complex**	**980**	**867**	**85,0**	**85,0**	**-**	**85,0**
2	**Camping area**	**1000**	**700**	**70,0**	**70,0**	**-**	**70,0**
3	**Rail road network**	**7000**	**21**	**14,7**	**14,7**	**-**	**14,7**
4	**Motor road**	**5000**	**18**	**9,0**	**9,0**	**-**	**9,0**
5	**Power supply network**	**10 000**	**10000/50* 10m2**	**0,2**	**0,2**	**-**	**0,2**
6	**Water supply line**	**5000**	**23**	**11,5**	**11,5**	**11,5**	**-**
	Overall			**190,4**	**190,4**	**11,5**	**178,9**

Land area allotment documents are confirmed by Decision No 118/3 dated 4th of March issued by Kungrat district Mayor.

Ministry of Agriculture and Water resources of Cabinet of Ministry of Republic of Karakalpakstan, Land resources department and governmental land cadastre division of Republic of Karakalpakstan assume as justified, and request Cabinet of Ministry of Republic of Karakalpakstan to review and approve Land area allotment documents.

Decision of the Governor of Kungrad province

About land allotment to JV Uz-KorGasChemical for construction of UGCC, camp for its workers, rail roads, automobile roads, electricity and water supply for the UGCC.

Having reviewed the documents prepared by the Committee for land allotment to JV Uz-KorGasChemical for construction of UGCC, camp for its workers, rail roads, automobile roads, electricity and water supply for the UGCC and based on the provision No 5 of the statute "about Land" of the Republic of Karakalpakstan:

I make a Decision

1. To approve an act of land allocation for the JV "Uz-KorGasChemical".
2.

No	Object	Length m.	Wide m.	Total are hectare
1	UGCC	980	867	85
2	Camp/Village	1 000	700	70
3	Rail roads	7 000	21	14.7
4	Automobile road	5 000	18	9
5	Electricity	10 000	10 000/50*10m2	0.2
6	Water	5 000	23	11.5

3. The chief Architect of the province (Sh. Seydullaev) to prepare Architectural Planning Assignment for construction of of UGCC, camp for its workers, rail roads, automobile roads, electricity and water supply for the UGCC.
4. The head of department for land allocation (Local "kadastr") (M. Jabbarbergenov) to make appropriate amendments in the land documentation.
5. To send this Decision to the Council of Ministers of the Republic of Karakalpakstan for approval.

Governor of the province o. Nurimbetov

Жер ресурслары

ҚОРАҚАЛПОҒЫСТАН РЕСПУБЛИКАСЫ ВАЗИРЛЕР КЕҢЕСИНИҢ

ҚАРОРИ

ҚАРАҚАЛПАҚСТАН РЕСПУБЛИКАСЫ МИНИСТРЛЕР КЕҢЕСИНИҢ

ҚАРАРЫ

Нукус қаласы

№ 44/4

Нөкис қаласы

"2" апрель 2009 ж.

Қарханаларға, шөлкемлерге ҳәм мекемелерге аўыл хожалығында пайдаланыўға ҳәм қурылыс ушын жер участкаларын ажыратыў ҳаққында

Өзбекстан Республикасы «Жер кодекси»ниң 20, 23-статьяларына Қарақалпақстан Республикасы «Жер ҳаққында»ғы нызамның 19, 45-статьяларына муўапық «Ўздаверлойиҳа» институтының Қарақалпақстан бөлими тәрепинен орынланған жойбарларды көрип шығып Қарақалпақстан Республикасы Министрлер Кеңеси

ҚАРАР ЕТЕДИ:

1. Қарханаларға, шөлкемлерге ҳәм мәкемелерге аўыл хожалығында пайдаланыў ушын жер участкаларын ажыратып бериў ҳаққындағы төмендеги көрсетилген район ҳәкимлериниң

Нөкис районы ҳәкиминиң 2008-жыл 23-декабрьдеги 574/12-санлы,

Хожели районы ҳәкиминиң 2009-жыл 6-мартдағы 106/3-санлы,

Қоңырат районы ҳәкиминиң 2009-жыл 4-мартдағы 118/3-санлы қарарлары тастыйықлансын.

2. Қарақалпақстан Республикасы Жер ресурслары ҳәм мәмлекетлик кадастры басқармасы ҳәм жоқарыда көрсетилген район ҳәкимиятлары мәмлекетлик жер есабына тийисли өзгерислерди киргизсин.

3. Усы қарардың орынланыўын қадағалап барыў Қарақалпақстан Республикасы Министрлер Кеңесиниң Аўыл ҳәм суў хожалығы мәселелери бойынша секретариатына (Муханов), Аўыл ҳәм суў хожалығы министрлигине (Эрманов) жүклансин.

Қарақалпақстан Республикасы
Министрлер Кеңесиниң Басшысы Б. Янгибаев

Вх 98

Қарақалпақстан Республикасы ауыл хәм суў хожалығы Министрлиги, Жер ресурслары, хәм мәмлекетлик кадастры басқармасының Нөкис районы «Тақырқол» АПЖ аймағындағы хакимият фонды жерлеринен Нөкис қаласы 22-санлы көп тармақлы панлерди тереңнен үйретиўши мектепке оқыў-тәжирийбе хожалығы ушын жер майданын ажыратыў ҳаққындағы

ЖУУМАҒЫ

Нөкис қаласы 1 декабрь 2008-жыл

Жер майданын ажыратып бериў хүжжетлери Нөкис қаласы 22-санлы көп тармақлы панлерди тереңнен үйретиўши мектептиң 2008-жыл 29-сентябрьдеги 7-санлы кеңес қарары ҳәм Өзбекстан Республикасы «Жер кодексиниң» 20 ҳәм 23-статьяларына муўапық «Ўздаверлойиҳа» институты Қарақалпақстан бөлими тәрепинен иследеген.

Районлық жер таңлаў ҳәм жер ажыратыў бойынша комиссия өзиниң 2008-жыл 1-декабрьдеги акти менен Нөкис районы «Тақырқол» АПЖ аймағындағы хакимият фонды жеринен Нөкис қаласы 22-санлы көп тармақлы панлерди тереңнен үйретиўши мектепке оқыў-тәжирийбе хожалығы ушын улыўма майданы 18,8 га, соннан;15,6 га сурим жерлер, 1,3 га жайлаўлар, 1,3 га жап-салма, изейкешлер хам 0,6 га жол-шеллерден ибарат болған жерлерди тураклы йейлик етиўге ажыратып бериўди уйғарды.

Жер майданын ажыратып бериў хүжжетлери Нөкис районы хакиминиң 2008-жыл 23-декабрьдеги 574/12-санлы карары менен тастыйықланған.

Ажыратылып атырған 15,6 га сурим жер майданларында соңғы ауыл хожалығы жылларында суўдың там-тарыслығы хамде техника күшлериниң жетиспеуи себепли егис егиўден қалыўына байланысы усы көрсетилген сурим жерлерден алынбаған пайда қаралмайды.

Қарақалпақстан Республикасы ауыл хам суў хожалығы Министрлиги, Жер ресурслары хам мәмлекетлик кадастры басқармасы жер ажыратып бериў хүжжетлерин тийкарлы деп санайды хам усы хүжжетлерди Қарақалпақстан Республикасы Министрлер Кеңесинен көрип шығып тастыйықлаўын сорайды.

Каракалпакстан Республикасы Ауыл хам суу хожалыгы Министрлиги,Жер ресурслары хам мамлекетлик кадастры баскармасынын Хожели районы «Найман» ауыл пукаралар жыйыны аймагындагы район хакимияти фонды жер майданынан 9202 әскерий бөлимге овош хам палыз егинлерин егиу ушын жер майданы ажыратып бериу хаккындагы

ЖУУМАГЫ

Нөкис каласы 2009 жыл «18» ...

Каракалпакстан Республикасы Жер дузиу хам көшпес мулк кадастр хызмети мамлекетлик унитар карханасы тәрепинен жер майданын ажыратыу хужжетлери 9202 әскерий бөлиминин 2009-жыл 27-февралдагы 3/1-434 санлы катнас кагазы хам Каракалпакстан Республикасы «Жер хаккындагы» Нызамынын 19,45-статьяларына муўапык исленген.

Катнас хатына тийкарлана отырып районлык комиссия өзинин 2009-жыл 2-марть акты менен Хожели районы «Найман» ауыл пукаралар жыйыны аймагындагы район хакимияти фонды жер майданынан 9202 әскерий бөлимге овош хам палыз егинлерин егиу ушын жами 10,2га соннан: 10,0 га сурим жерлер хам 0,2 га жап хам салма жерлерди узак муддетке 10-жылга пайдаланыуга жер майданын ажыратып бериуди уйгарды.

9202 әскерий бөлимге ажыратылып атырган 10,0 га сурим жерлер «Уздаверлойиха» институты жер кадастры филиалынын 1998-жылгы балл бонитетин анықлау хужжетлери бойынша балл бонитети 60,0 баллга ийе.

Ажыратылып атырган 10,0 га сурим жерлер узак муддетке 10-жылга пайдаланыуга ажыратылыуына байланыслы алынбаган пайда каралмайды.

Жер майданын ажыратып бериу хужжетлери Хожели районы хакиминин 2009-жыл 6 -мартьдаги № 106/3 санлы карары менен тастыйыкланган.

Каракалпакстан Республикасы Ауыл хам суу хожалыгы Министрлиги,Жер ресурслары хам мамлекетлик кадастры баскармасы жер ажыратып бериу хужжетлерин тийкарлы деп санайды хам усы жуумакты Каракалпакстан Республикасы Министрлер Кенесинен көрип шыгыуын хам тастыйыклауын сорайды.

Каракалпакстан Республикасы Ауыл хам суу хожалыгы Министрлиги,Жер ресурслары хам мамлекетлик кадастры баскармасынын Коңырат районы Коңырат аншылык тогай хожалыгы аймагынан «УзКорГазКемикал» жууапкершилиги шекленген жамийети косма карханасы Устюрт Газохимиялык комплексе хам усы комплексте ислейтугын жумысшыларга турак жай поселкасы курыуга,темир жол тармагы,автомобил жолы,электр тармагы хам суу тармагы курыу ушын жер майданын ажыратып бериу хаккындагы

ЖУУМАГЫ

Нөкис каласы 2009 жыл «18» ...

Каракалпакстан Республикасы Жер дузиу хам көшпес мулк кадастр хызмети мамлекетлик унитар карханасы тәрепинен жер майданын ажыратыу хужжетлери «УзКорГазКемикал» жууапкершилиги шекленген жамийети косма карханасынын 2009-жыл 20-февральдагы 67-санлы катнас кагазы хам Каракалпакстан Республикасы «Жер хаккындагы» Нызамынын 19-статьясына муўапык исленген.

Катнас хатына тийкарлана отырып районлык комиссия өзинин 2009-жыл 3-марть акты менен Коңырат районы Коңырат аншылык тогай хожалыгы аймагынан «УзКорГазКемикал» жууапкершилиги шекленген жамийети косма карханасына төмендеги көрсеткишлерде жер майданларын пайдаланыуга ажыратып бериуди уйгарды.

Тәртиб №	Объектлер атамалары	Узыны метр	Ени метр	Жами майданы га	Соннан: Баска жерлер га	Уакытша пайдаланыуга га	Турахлы пайдаланыуга га
1	Устюрт Газохимиялык комплекси	980	867	85,0	85,0	–	85,0
2	Турак жай поселкасы	1000	700	70,0	70,0	-	70,0
3	Темир жол тармагы	7000	21	14,7	14,7	-	14,7
4	Автомобил жолы	5000	18	9,0	9,0	-	9,0
5	Электр тармагы	10 000	10000/50*10м²	0,2	0,2	-	0,2
6	Суу тармагы	5000	23	11,5	11,5	11,5	-
	ЖАМИ»			190,4	190,4	11,5	178,9

Жер майданын ажыратып бериу хужжетлери Коңырат районы хакиминин 2009-жыл 4-мартьдаги № 118/3 санлы карары менен тастыйыкланган.

Каракалпакстан Республикасы Ауыл хам суу хожалыгы Министрлиги,Жер ресурслары хам мамлекетлик кадастры баскармасы жер ажыратып бериу хужжетлерин тийкарлы деп санайды хам усы жуумакты Каракалпакстан Республикасы Министрлер Кенесинен көрип шыгыуын хам тастыйыклауын сорайды.

ACADEMY OF SCIENCES OF THE
REPUBLIC OF UZBEKISTAN
INSTITUTE OF MICROBIOLOGY
7B, A.Kadyri str.
Tashkent, 100128
Phone: (99871) 244-25-19; 244-45-03
Fax: (99871) 242-71-29; 244-25-82
http://www.microbio.uz
e-mail: imbasru@uzsci.net

№ 1-468
Dated October 27, 2010

To: Poluanbaev M. P.
Head of USE "Ustyurtgas"

In reference to your letter # 1/MP-1703, the Institute of Microbiology, informs you, that it is necessary to conclude an economic agreement for the introduction of higher aquatic plants and microorganisms association for wastewater of the USE "Ustyurtgaz".

Higher aquatic plants can grow only after the destruction of pollutants active strains of bacteria. Follow-up treatment of wastewater occurs in the community of microorganisms and higher aquatic plants, the root system which is an excellent natural microflora of the immobilizer.

The purpose of the proposed economic agreements will study the composition of wastewater and microorganisms living in these drains, the adaptation of higher aquatic plants in wastewater and establishing an effective association of microorganisms for cleaning them.

In the case of a contract, please provide details of your organization. Contract amount will depend on the complexity of the work, distance and number of objects.

Executive will be Doctor of Biological Sciences, Professor, D. Kutliev

Office phone: 244 25 11
Mobile: 709 27 43

Acting Director: Tashpulatov J. J.

pards.

FANLAR AKADEMIYASI
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№ 1-468
от «27» 10. 2010

Начальнику УДП
«Устюртгаз»
Полуанбаеву М.П.

В ответ на Ваше письмо №1/МП-1703 Институт микробиологии сообщает, что необходимо заключить хоздоговор для внедрения высших водных растение и ассоциации микроорганизмов для очистки сточных вод УДП «Устюртгаз».

Высшие водные растения могут расти только после деструкции загрязнителей активными штаммами бактерий. Последующая очистка сточных вод происходит в сообществе микроорганизмов и высших водных растений, корневая система которых является прекрасным естественным иммобилизатором микрофлоры.

Целью предлагаемого хоздоговора будет изучение состава сточных вод и микроорганизмов обитающих в этих стоках, адаптация высших водных растений к сточных водам и создание эффективной ассоциации микроорганизмов для их очистки.

В случае заключения договора просим сообщить реквизиты Вашей организации. Сумма договора будет зависеть от сложности работы, отдаленности и количества объектов.

Ответственным исполнителем будет д.б.н., проф. Дж.Кутлиев.

Тел.: сл. 244 25 11
моб.: 709 27 43

И.о. директора **Ташпулатов Ж.Ж.**

KUNGRAD DISTRICT

SUPERVIOSION CENTRE FOR SANITATION AND EPIDEMIOLOGY

Ref. no.386 **Date 06 April 2011**

To: **Directorate for the Construction of the UGCC Infrastructure and the Surgil Gas Field Facilities**

Att.: **Mr. O.U. Orinbaev**

In response to your letter of request Ref. no.1/OU-0181of 05.04.2011 the Kungrad District Supervision Centre for Sanitation and Epidemiology hereby is advising you on the following:

As of today Akchalak and Elabad settlements have favorable epidemiological situation. No HIV/AIDS infection has been reported in the settlements.

Mr. K. Utelbaev

Chief Medical Officer
Kungrad District Supervision Centre
for Sanitation and Epidemiology

To: **Directorate for the Construction of the UGCC Infrastructure and the Surgil Gas Field Facilities**

Att.: **Mr. O.U. Orinbaev**

For the purpose of Resolutions of the President of the Republic of Uzbekistan No.NP-797 of 18.02.2009 and No.NP-11-68 of 04.04.2009 issued by the response to your letter of request Ref. no.1/OU-0181of 05.04.2011 no HIV/AIDS diseases has been reported in the Muinak District.

Chief Medical Officer
of the Muynak Distric Hospital **Mr. Ernadirov**

Deputy Midical Officer
Of the Muynak Distric Hospital **Mrs. Zh. Davletova**

Venerologist
Of the Muynak Distric Hospital **Mr. A. Matmuratov**

14.03.115 № 06-24/426

To: Abdurasulov F.R

Deputy Chairman of JV «Uz-Kor Gas Chemical»

For Your letter № 01-4/07.121
Dated on 09.03.2011

SC «Urgenchtransgas» informs that in our enterprise there is data existed on average monthly usage at Kubgrad WSU from 2005 to 2010 years, other s were not saved. We send information, was requested.

Information is attached in the attachment № 1.

Acting Chief Engineer **O.B. Matchanov**

Actual water consumption (cubic meter) at Kungrad WSU from 2005 to 2010 with breakdown in quarter

years	1st quarter	2nd quarter	3rd quarter	4th quarter	annual
2005	1796200	3104900	3279500	1895400	10576000
2006	1769000	2978400	4217500	2303100	11268000
2007	2192900	2683500	3153900	2312700	1034300
2008	2378900	2885800	3023300	2352200	10640200
2009	2232700	2730500	2786600	2020500	9830300
2010	1960300	2344200	2589200	2011800	8905500

O'ZBEKISTON
"O'ZKOMMUNXIZMAT"
AGENTLIGI

TUYAMO'YIN – NUKUS MINTAQALARARO
SUV O'TKAZGICHIDAN FOYDALANISH
BOSHQARMASI

O'ZBEKISTAN
"O'ZKOMMUNXIZMET"
AGENTLIGI

TUYEMOYIN – NO'KIS REGIONARALIQ
SUW O'TKIZGISHINEN PAYDALANIW
BASQARMASI

742000 Qaraqalpaqstan Respublikasi No'kis qalasi Ernazar Alakoz ko'shesi n/s
Telefon 8-361-224-50-41 Fax 8-361-224-50-46 e-mail: vodovod@rol.uz

10 Июня 2011 г. № 84

Координатору
СП ООО «Uz - Kor Gas Chemical»
Аннаклычеву С.С.

На письмо №Н-14 от 9 июня 2011 г

В 2010 году по УЭМВ Туямуюн-Нукус всего реализован питьевой воды на 21771,0 тыс.м3, в 1 квартале 2011 года реализован 4256,0 тыс.м3, количество пользующихся водой на 1.01 2011 год составляет 101662 потребителей, в том числе по населению 100304 хозяйств.

Зам. директор: **Ниетуллаев М.**

Вх. № 5
10.06.11

To the first deputy chairman of
NHC "Uzbekneftgaz"
Sh.H. Majitov

Copy: **To the first deputy of**
JV LLC "Uz-Kor Gas Chemical"
L.A. Evdokimov

According to the request of JV LLC "Uz-Kor Gas Chemical" #01-2/05-235 from 26.05.2011, Stock Company "Uztransgaz" informs:

The historical data on quarterly and annual water intake from Kungrad TWSD did not save since 1980. Information on the annual intake, since 1998, was earlier sent from SC "Urgenchtransgaz" to the JV LLC "Uz-Kor Gas Chemical" by letter #06-24/583 from 7.04.2011.

There are two ground-bottom basins in the operation of Kungrad TWSD, which serve as waste-water basins. According to the saved situations schemes, the capacity of the working waste-water basin is 500 000m^3, of the standby – 2 500 000m^3, the length of the channel is 3km, the depth is 9m. Because the channel and basins serve as waste-water basins, their bottom for 35-40 years thoroughly silted and initial design capacity could not be confirmed. The capacity of water in the waste-water basins is only partially solves the issue of emergency supplies. Take out the entire volume of water from waste-water basins is not technically possible because of the construction features of a floating pumping station of the 1 lift.

There are no measures to reduce water wastage in the water intake from the bed of the river, the losses to evaporation and to the filtering back in the river, because of the difference of levels, will always be the case.

Annex: The information on the annual release of the water from Kungrad TWSD from 1998 to 2010. 1 sheet

General Manager **T.T. Juraev**

Annex #1

Actual water consumption in Kungrad TWSD from 1998 to 2010

Years	Water flow in m^3
1998	11381000
1999	11544000
2000	12182000
2001	12182000
2002	12173000
2003	12180800
2004	11852000
2005	10576000
2006	11268000
2007	10343000
2008	10640200
2009	9830300
2010	8905500

SES Principal engineer D.Sh.Hodjaev

Приложение № 1

Фактическое потребление воды по Кунградскому УТВС с 1998 г по 2010 г

Годы	Расход воды в м3
1998 г	11381000
1999 г	11544000
2000 г	12182000
2001 г	12182000
2002 г	12173000
2003 г	12180800
2004 г	11852000
2005 г	10576000
2006 г	11268000
2007 г	10343000
2008 г	10640200
2009 г	9830300
2010 г	8905500

Ведущий инженер СЭН Д.Ш. Ходжаев

JV LLC <<Uz-Kor GasChemical>>
To the first deputy chairman
Mr. Evdokimov L.A.

We reviewed the received information about the construction of Ustyurt Gas Chemical Complex and development of the field <<Surgil>> and analyzed it for possible location in the project area of cultural and historical heritage. Preliminary assessment of the project area based on data from the Institute of objects of cultural and historical heritage was conducted. All these allow tentatively conclude that the project area does not affect the currently known objects of historical and cultural heritage on the Ustyurt, and even more so that the new pipeline will be laid along the existing pipelines route and the project will not have negative impacts on cultural heritage.

With regard to the drained Aral Sea bottom areas, the Institute does not have any information about the presence of historical and cultural heritage there.

However, we cannot exclude the discovery of new, previously unknown objects in the process of construction.

In this regard, we are ready to send our representative to inspect the project area and prepare the final conclusion during April 2011.

Sincerely yours,

Institute Director, professor V.N. Yagodin

O'zbekstan Respublikasi' Ilimler
Akademiyasi' Qaraqalpaqstan Bo'liminin'
**TARIYX, ARXEOLOGIYA HA'M
ETNOGRAFIYA INSTITUTI'**

O'zbekiston Respublikasi Fanlar
Akademiyasi Qoraqalpog'iston Bo'limining
**TARIX, ARXEOLOGIYA VA
ETNOGRAFIYA INSTITUTI**

The Institute of History, Archaeology and Ethnography of Karakalpak Branch
of the Academy of Sciences of the Republic of Uzbekistan

04.04.2011 № 10

СП ООО «Uz-Kor GasChemical»
Первому заместителю председателя
Г-ну Евдокимову Л.А.

Мы рассмотрели полученную информацию о проекте строительства Устюртского Газо-Химического Комплекса и освоения месторождения «Сургиль» и проанализировали её на предмет возможного находжения в проектной зоне объектов культурно-исторического наследия. Проведена предварительная оценка проектной зоны на базе данных Института об объектах культурно-исторического наследия. Все это позволяет в предварительном плане заключить, что проектная зона не затрагивает известные на настоящий момент на плато Устюрт объекты историко-культурного наследия, и тем более, что новый трубопровод будет прокладываться вдоль уже существующих трубопроводных маршрутов и реализация проекта не будет иметь негативного воздействия на объекты культурного наследия.

Что касается осушенных участков дна Аральского моря, то Институт не располагает какой-либо информацией о наличии там объектов историко-культурного наследия.

Вместе с тем, нельзя исключить обнаружения новых, ранее не известных объектов, в процессе строительных работ.

В связи с этим, мы готовы в течение апреля 2011 года направить своего представителя для осмотра проектной зоны и подготовки окончательного заключения

С уважением

Директор Института, проф. В.Н.ЯГОДИН

QORAQALPOG'ISTON
RESPUBLIKASI
NUKUS SHAHAR
UZ KOR GAS
CHEMICAL
Mas'uliyati cheklangan jamiyati
shaklidagi qo'shma korxonasi
2011 yil "5" апреля
№ 119 -son

Amir Timur 179 a, Nukus, 230100 Karakalpakstan, UZBEKISTAN
Tel: (99861) 2240598; Fax: (99861)2221744. email: istnuk@mail.ru

Translation:

PLAN:
Construction of GAS CHEMICAL COMPLEX on the Northern-East part of Akchalok settlement of Kungrad district located on Ustyurt Plateau

I – PART.

I. General.

1. Basis for preparation of Tasks for Architectural Planning (TAP): - *Decree No118/3 dated March 4 of this year issued by Mayor of Kungrad district base on the Certificate-act dated March 3, 2009 and submitted from Permanent commission for land allotment, arranging its release for construction activities.*
2. Owner: **Joint Venture "Uz-Kor Gas Chemical" Limited Liability Company**

II. Description of Land to be allotted

1. Location place of land: - *It is planned to allot 85 hectares for gas chemical complex construction on Ustyurt plateau fields located on Kungrad District. It is considered to allot approximately 70 hectares for construction of town for operational staff. Ground level is plain. Land area configuration is in directly corner, located on the Northern-East and Southern-West part surrounded by Ustyurt Plateau fields, open land area. Location map is attached to this TAP.*
2. Are there any ongoing construction activities on the land area: - *No, there are not.*
3. Are there any existing engineer services and communications on the land area: - *No, there are not.*
4. Are there any green fields and plants: - *Draft Plan should be obtained from (ZVOS) Nature Environment Protection Committee of Republic of Karakalpakstan and one copy from all those draft plan documents should be submitted to District Architecture Division as an appendix*.
5. Topographical study: - *Necessary to carry out survey, and survey layout battery limits shall be attached to layout plan of Tasks for Architectural Planning (TAP).*
6. Engineer geological study: - *There should be carried out engineer geological scientific research works*.
7. Earthquake proofness: - Earthquake *proofness of Ustyurt Plateau should be studied and there should be provided certificate-act issued by Specialized Company that studies Earthquake proofness and delivered to Design Institute*.

III. Requirements for Architectural Planning

1. Project type to be implemented: - *"New unusual Gas Chemical Complex Project and project of town for its operational staff must be developed".*
2. Proposals that should be considered during implementation of the project: - *during implementation of the project major façade, both of its sides, Western and Northern parts were calculated. It is proposed as a main part of entrance best choice from Western-Northern part of Complex. It should be paid an attention to orientation during placement. It is necessary to provide proper architectural design for all facades of Complex buildings.*
3. Integrity of construction facilities or proposals for purposely use of free land areas: - *proposals for draft project in order to arrange plants greenery and also for purposely use of free land areas should be prepared.*
4. Special requirements for finishing and decorating work of internal parts of buildings: - *finishing and decorating work of internal parts of buildings in Main and Administrative buildings of Complex shall be in appropriate with national traditions and in decorations form of national patterns. Those activities should performed in high quality.*
5. Requirements for finishing works of facades: - *finishing and decorating work of internal parts of facades in Main and Administrative buildings of Complex shall be in as per Oriental forms, valid for long period, modern colors.*
6. Necessary works for external development, greenery arranging, watering, forms of small architecture and artistic decoration activities: - *Necessary to study and consider works for external development, greenery arranging, watering, forms of small architecture and artistic decoration activities yards and surroundings of Complex order to arrange plants greenery and also for purposely use of free land areas. Also should be considered cold season winter period and very hot in summer period. There should be installed and provided Pole Lights along with the automobile and motor roads on the way to Complex. It should be considered artistic decorations and architectural finishing in designing.*

IV. Additional requirements

1. *Necessary to consider and correspond to requirements of "Norms for Design protecting facilities" during planning of all measures to be taken in emergency cases. General Plot Plan of town for operational staff should be developed in compliance with Akchalok settlement.*
2. *Area General Plan of the Project and Drafts of architectural details and General Plot Plan of the Complex, location plans of buildings, their external and internal views, facades and interior parts of buildings must be presented for review to City Construction Council of State committee for architecture and construction of Republic of Uzbekistan. After that City Construction Council confirms the drafts of projects it should be released to working design. Request should be issued to Nukus branch of "UZGIITI" scientific research design institute in order to develop design and prepare in real drawings.*

3. The following specified are complete details of the Project necessary for agreeing with the City Construction Council and Chief Architect of District:

1. *General location layout plan is given in scale 1:2000.*
2. *General arrangement layout plan that includes arranging greenery and planting activities for the Complex are given in scale 1:2000.*
3. *The Major facades layout plan with decoration and buildings sections of the Complex.*
4. *Internal parts (interiors) of Main rooms, fragments of entrance points, complex lattices, fences, architectural forms and others.*

V. Contents of documents attached to TAP

- *Copy of Certificate-act dated March 3 2009 submitted from Permanent committee for land allotment, arranging and its release for construction activities;*
- *Extract copy of Decision No118/3 dated March 4, 2009 issued by Mayor of Kungrad District;*
- *Location plans and topographic battery limits during land area allotment.*

1. Validity term of Tasks for Architecture Planning: _____

Agreed by:
Chief Architect of
Kungrad District
SH.SEYDULLAEV

Head of Division:
H.RADJAPOV

Prepared by:
D.ARZUOV

Translation:

CERTIFICATE - A C T

Kungrad city 3 March, 2009

We hereinafter conclude this certificate-act that members of Permanent committee for land allotment and arranging its release for construction together with Kungrad district municipality representatives and undersign as follows:

Chief of Commission

1. J.ADILOV - First Deputy Mayor of Kungrad District

Members of Commission

2. ATADJANOV K. - Chief of Water Services Division of District
3. M.JABBARBERGENOV - Chief of Ground Resources and Cadastre Division of Government
4. SH.SEYDULLAEV - Chief Architect of District
5. K.UTELBAEV - Head Doctor of Sanitary Epidemiological Department of District
6. M.KURBANBAYEV - Head of Forests and Hunting Division
7. AYTMURADOV P. - Temporary executive Chairman of regional division of Committee for Nature Protection of the Republic of Karakalpakstan
8. ORINBAYEV O.YU. - First Deputy Chairman of Joint Venture "Uz-KorGas Chemical" Limited Liability Company
9. ISMETOV S. - Senior specialist of department "Land allotment and arranging its release" of Land determination and cadastre division of State Unitary enterprise of the Republic of Karakalpakstan

Wording of certificate-act is specified hereunder:

Concerning land allotment on the territory of Kungrad forests and hunting division of Kungrad district for the purpose of construction of Ustyurt Gas Chemical Complex, town for operational staff and providing automobile and motor roads, railroads, power supply networks, water supply lines for Joint Venture "UzKorGasChemical" Limited Liability Company

Basis for execution of present land allotment: Official request letter No67 dated 20 February 2009 submitted from Joint Venture "UzKorGasChemical" Limited Liability Company and in accordance with article 19 of Provision "Concerning Land" of the Republic of Karakalpakstan.

Members of commission, after considering and based on the official request letter and the article 19 of Provision "Concerning Land" of the Republic of Karakalpakstan, adopted to

allot land on the territory of Kungrad forests and hunting division of Kungrad District for the purpose of construction of Ustyurt Gas Chemical Complex, moreover town for operational staff and providing automobile and motor roads, railroads, power supply networks, water supply lines for Joint Venture "UzKorGasChemical" Limited Liability Company, and determined dimensions of land as following:

S/q No	Facilities name	Length, meter	Width, meter	Total area, hectare	Including:		
					Other areas, hectare	For temporary usage purposes, hectare	For permanent usage purposes, hectare
1	Ustyurt gas chemical complex	980	867	85,0	85,0	-	85,0
2	Town for operational staff	1000	700	70,0	70,0	-	70,0
3	Rail road network	7000	21	14,7	14,7	-	14,7
4	Automobile and motor road	5000	18	9,0	9,0	-	9,0
5	Power supply network	10 000	10000/50* 10m2	0,2	0,2	-	0,2
6	Water supply line	5000	23	11,5	11,5	11,5	-
	Overall			190,4	190,4	11,5	178,9

Location plan of allotted land area is mentioned as per layout plan in scale of 1:10 000.

Conclusion of commission:

Kungrad *forests and hunting division* of Kungrad district determined that allotted land area for construction of Ustyurt Gas Chemical Complex, town for operational staff and providing automobile and motor roads, railroads, power supply networks, water supply lines for Joint Venture "UzKorGasChemical" Limited Liability Company satisfies to all sanitary and ecological requirements and norms.

Members of district commission determined and approved as reasonable and eligible to use above mentioned land and moreover request the Mayor of Kungrad district to consider and approve present certificate-act.

Chief of Commission

1. J.ADILOV

Members of Commission

2. ATADJANOV K.

3. M.JABBARBERGENOV

4. SH.SEYDULLAEV

5. K.UTELBAEV

6. M.KURBANBAYEV

7. AYTMURADOV P.

8. ORINBAYEV O.YU.

9. ISMETOV S.

Translation:

PLAN:
Construction of GAS CHEMICAL COMPLEX and town on the Ustyurt Plateau located on Kungrad district

2. Owner: Joint Venture "UzKorGasChemical" Limited Liability Company

II – PART

Major requirements for connection with engineer services and communications, for fabrication and construction till the Project Site

I. General

1. Basis for preparation of Tasks for Architectural Planning (TAP): - Decision No118/3 dated March 4 of this year issued by Mayor of Kungrad district based on the Certificate-act dated March 3, 2009 submitted from Permanent commission for land allotment and arranging, and its release for construction activities

2. Owner: **Joint Venture "UzKorGas Chemical" Limited Liability Company**

II. Basis Part

1. Technical terms and conditions to be considered in Design documents for connecting to engineer services and communications: *It should be taken into consideration during planning and arrangement of Design documents related to connection with those engineer services and communication, installation of devices and equipments; all activities must be in strict accordance with coordination plans of organizations and it should be carried out as per General plot plans and location plans of Complex.*

Engineer services and communications:

1. *Supply of potable water*
2. *Supply of Heating*
3. *Supplying Gas*
4. *Power Supplying*
5. *Providing with external and night pole lights*
6. *Telephone lines installing*
7. *Providing with radio*
8. *Technical terms and conditions should be obtained from Department for Emergency Situations of Republic of Karakalpakstan for protecting measures in Emergency Situations.*
9. *Arranging green areas and improvement*

There must be executed coordination of scale of survey layouts and the tracks of engineer services and communications:

Planning arrangement of external area communications should be in topographic map in scale of 1 : 2000 or 1 : 5000. Survey layout plans and the tracks of Engineer services and communications shall be carried out in complying with architect and construction division of district and those organizations who has submitted technical terms and conditions.

III. General requirements:

1. *At the end of construction, before trenches backfilling, there should be issued request order to Division of Architect and Construction, and Common Utilities organizations, by presenting execution plans (layout) of those trenches to them whether they are prepared plainly or non-plainly.*
2. *Before implementing the construction there should be removed or temporarily replaced to another place, or deleted any kind of facility or others. At the event if it is necessary to remove aboveground and underground engineering communications then it should be considered at the design stage.*

IV. Technical part.

1. *General plot plan shall be drawn up according to the requirements of Division of Engineer-Architect and Construction, and City Construction as in scale 1 : 2000 of topographical layout.*
2. *Necessary to develop Project for organizing the Construction.*
3. *Should be find out are there any geodesic symbols or signs on the Construction Site area. In case if those geodesic symbols and signs are on the Construction Site area, they are to be removed from the Site area in coordinating with service of geodesy and Division of Architecture and Construction. All expenses for removal and replacing of those symbols and sign should be included into Estimates cost documents of the Project.*

   Before drawing in to realization by the Production Group of Division of Architecture and Construction the intended land area should be cleaned, leveled and aligned. Before the Construction works start the Site object should be registered by Supervision Department of State Architecture and Construction of Republic of Karakalpakstan.

Validity of Tasks for Architectural Planning _____

Agreed by:
Chief Architect of
Kungrad District
SH.SEYDULLAEV

Head of Division:
H.RADJAPOV

Prepared by:
D.ARZUOV

**ЎЗБЕКИСТОН РЕСПУБЛИКАСИ
ҚИШЛОҚ ВА СУВ ХЎЖАЛИГИ
ВАЗИРЛИГИ**

100004, Тошкент ш., Навоий кўч., 4
Тел.: (998-71) 241-00-42, 241-23-73
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**MINISTRY OF AGRICULTURE
AND WATER RESOURCES
REPUBLIC OF UZBEKISTAN**

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02.06.11г. №05-1/29 174

**СП ООО
«Uz-kor Gas Chemical»**

Министерство, рассмотрев Ваше письмо №01-2/05-164 от 12.04.2011г. касательно реализации проекта «Строительство Устюртского Газо-Химического Комплекса», сообщает следующее:

Потребный объём речной воды, необходимый для обеспечения Содового завода и КС-Акчалак (и других водопотребителей) в размере 25000-35000 $м^3$/сут или 0,2-0,3 $м^3$/сек, практически не влияет на водный режим реки Амударьи ниже Тахиаташского гидроузла. Значительные трудности могут наблюдаться только в критически маловодные годы и их можно компенсировать:

- подключением со стороны УВ Нукус-Туямуюн;
- увеличением емкости водохранилища Кунградской УВ, путем доведения емкости до 3,0-3,5 млн.$м^3$;
- строительством скважин вертикального дренажа вокруг водохранилища Кунградской УВ (если обнаружится водоносный горизонт).

Представляемый проект никакого отношения к системе озера Судочье не имеет.

При реализации проекта водозабор из поверхностных вод в размере 0,2-0,3 м3/сек будет выделяться в установленном порядке, согласно Закона «О воде и водопользовании» и Постановления Кабинета Министров Республики Узбекистан №385 «О лимитированном водопользовании в Республике Узбекистан».

**Заместитель начальника Главного
управления водного хозяйства** [signature] **Р.Мамутов**

[illegible]

Ministry of Agriculture
and Water Resources
Republic of Uzbekistan
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« Uz-kor Gas Chemical »

The Ministry had reviewed your letter regarding development of Surgil Project and informs the following:

The demanded volume of water from the river in order to supply Kungrad Soda Ash Plant and Akchalak Compressor Station (and other users) is in the amount of 25000-35000 m3 per day or 0.2-0.3 m3 per second almost does not have influence on the water flow of Amudarya river downstream of the Takhiatash Hydro station. Difficulties may arise only during critical low flows of the river , but they can be compensated by:

- connecting to Nukus-Tuyamuyun WSU;
- by increasing the capacity of the Kungrad WSU water reservoir, up to 3-3.5 million m3;
- construction of drainage wells around the Kungrad WSU water reservoir (if there is a water horizon)

The Project does not have any influence over the Sudoch'e lake system.
For the implementation of the Project water abstraction from the water surface in he amount of 0.2-0.3 m3 per second will be accomplished in the set order, in accordance with the Law on "Water and water use" and Decree of the Cabinet of Ministers of the Republic of Uzbekistan No. 385 about "Limited use of water in the Republic of Uzbekistan"

Deputy head of the Chief Office of Water Use

R. Mamutov

O'ZBEKISTON RESPUBLIKASI
TABIATNI MUHOFAZA QILISH
DAVLAT QO'MITASI

100017, Toshkent sh., Mustaqillik maydoni, 5. tel.:
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STATE COMMITTEE FOR NATURE
PROTECTION OF THE REPUBLIC OF
UZBEKISTAN

5, Mustakillik Sq., Tashkent, 100017. phone:
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R E P O R T
Of State environmental expert review

On the:"ESIA of the integrated development of Surgil field with extraction of valuable components"

Owner: NHC "Uzbekneftegaz"
Designer: OJSC "Uzlitinieftgaz"

To: ***Sh. X. Majitov***
First Deputy Chairman of NHC "Uzbeknegtegaz"

Copies: ***P.D. Aytmuratov,*** acting Chairman of the
Nature Conservancy Committee of the Republic of Karakalpakstan;

V.A. Atalyanc, Chief Engineer of OJSC "Uzlitineftgaz".

The state environmental expert evaluation have considered the materials of the second stage of evaluation under ESIA for integrated development of Surgil field with extraction of valuable components and construction of Ustyurt Gas Chemical Complex (UGCC), located in Kungrad region of the Republic of Karakalpakstan at the East cliff of Ustyurt, 3 km to the northeast from Akchalak settlement.

The entire technological unit is located at one site of unused land area (72 hectares). The site is selected at the level ground area, at 4-5 km from Akchalak CS, in south-west there is a railway and road Kungrad-Beiney and main gas pipeline Central Asia - Center. The Project also provides the construction of settlement at 3 km southwest of UGCC (next to Akchalak settlement) and welfare facilities for the employees with total area of 66.18 hectares.

In accordance with the current situation, the waste from Akchalak CS and CGTU Akchalak lead to concentration of pollutants, which affect the area of 1-2km, but the UGCC site, does not have a significant impact due to the sufficient distance.

The geological structure involves two geotechnical complexes:

- Argillaceous - marl sediments of Paleogene deposits, in form of carbonate rocks, characterized by anhydrous barriers;
- Limestone-marl deposits, in form of a lower-neogene material.

With regard to the physical and mechanical characteristics, soil is differing with its swelling, and it also has deformation properties, therefore it should be replaced by an artificial soil.

The soil cover with 0.5 - 1.5m of thickness includes the sandy loam with limestone, and loose fissured limestone below. Due to the high salinity of soil, the low fertility land is unsuitable in agriculture. The radioactivity of soil does not exceed acceptable standards.

Decision to construct UGCC arose due to the development of Surgil field and production of 3.0 bcm of raw gas per year, characterized by a high content of valuable components (ethane, propane, butane and condensate).

Currently, 1.0 bcm of raw natural gas is being produced on the field; after its treatment and drying in low temperature separator (LTS), the gas is transported by East Berdakh - Bukhara-Ural pipeline. The implementation of project with Surgil field development provides the transportation of raw gas from CGTU to UGCC for it further treatment and processing into the fractions upon the weighting of the hydrocarbon components.

UGCC is designed in accordance with the technology of Shurtan GCC, based on sequential extraction of ethane to produce polyethylene, propane and butane for further production of liquid gas and condensate:

- Gas Gathering Unit (supply of gas through two pipelines - from Surgil field and East Berdakh field), for separating liquid hydrocarbons from raw gas.
- Dehydration and mercury removal unit with the utilization of adsorbent for production and disposal of mercury sulphide;
- Ethane production unit;
- Deethanized products separation unit;
- Unstable condensate treatment unit to extract the volatile hydrocarbons.

In accordance with the calculations, the amount of air emissions from the designed facilities (similar to the existing technological facilities at Shurtan GCC) shall compose 2482,165 tons / year of pollutants. The main sources of such pollutants shall be the steam generators, sales gas compressor, Ethylene production plant, polyethylene production plant, pyrolysis furnace and warehouse. The greatest impact to the air pollution is making carbon monoxide (38.3%), nitrogen dioxide (37.8%), nitrous oxide (9.5%), cyclohexane (4.2%), and hydrocarbons (3.3%).

In order to prevent the placement of field camp in the area of disposal of wastes from UGCC designed facilities and existing Akchalak CS, the determination of air pollution impact includes the aggregate wastes from both sources. The waste disposal from Kachalak CS sources composes 1392.78 tons / year.

The generated total wastes outside the processing facility and within the camp will not exceed the prescribed norms. The largest concentration shall occur in nitrogen dioxide, which value at the territory of settlement composes 0.17 of maximum concentration limit (MCL).

The water supply for designed facilities shall be conducted from the existing water pipeline Kungrad – Karakalpakiya CS; current consumption of water composes 1260 m / hour.

For the disposal of waste water it is provided the construction of three separate sewer systems: for the clean contaminated (from cooling system), oily and household wastewater. The total number of industrial wastewater shall compose 70 m / h, with -50 m / hour of waste water.

Oil-contaminated waste waters, gathering at the fuel oil subsystem and warehouse shall be treated in a basin and oil separator. After their intermixing with clean contaminated water flow in the control basin, it is provided the usage of watering plants in the perimeter of the sanitary protection zone with the creation of artificial lakes for fire water storage.

Household waste water in a volume of 10 m / h shall be supplied to the biological treatment unit with compact systems KUTM-210, containing the aeration tank and catch basin.

In case of operation of process equipment during emergency mode, gas and condensate leak, there is a risk of explosive and fire dangerous situation that can lead to the negative consequences for the environment. To minimize the negative environmental impact, project provides the measures and methods to control the processing parameters of field development using modern systems of automation and telemechanics: the main components include nitrogen dioxide, sulfur oxides, carbon monoxide, and methane.

Key measures to ensure the prevention of pollution include:

- use of high quality sealing system for the compressors and double mechanical valves for pumps, delivering the liquid hydrocarbons;
- use of tanks with floating roof;
- enclosure of methanol storage facility, washing oil, sulfuric acid, dimethyl sulfide, caustic;
- maximum possible reduction of waste water;
- provision of special disposal area to discharge the waste with further treatment and recycling for its subsequent sale to third parties.

The Project provides the environmental monitoring conducting on the basis of special program that determines the particular location of the observation network, the frequency of sampling, a list of controlled indications, as well as the composition of the reporting documentation.

The environmental expert evaluation of the submitted materials has determined the adequacy of its scope and content for the second stage of ESIA. The next stage of assessing the environmental impact should provide the environmental impact statement (EES), which needs to contain the environmental standards for discharge of pollutants into the environment as well as generation and disposal of waste.

Prior to completion of construction the object, which leads to the land disturbance, it is necessary to determine object area, to develop a reclamation plan indicating the land restoration techniques, the scope of required work and timetable for their completion. The restoration plan should be agreed with the regional nature conservancy committee and the EES should include the information on its implementation.

EES should be submitted to the state environmental expert evaluation in accordance with legislation order, before the commissioning of construction object.

State environmental expert evaluation shall consider the environmental impact of the construction of UGCC in Kungrad region, Republic of Karakalpakstan.

The Committee of Nature Conservancy of the Republic of Karakalpakstan should take under control the compliance of construction and development of UGCC with the requirements of environmental legislation. During implementation of preventive control, it is necessary to focus on the implementation of technical and technological activities directed to the reducing negative impact to the environment.

JV "Uz-Kor Gaz Chemical"
To A. Kasimov

Committee of Management of the Suduchye Lake (CMSL) familiarized with the construction plan of Ustyurt Gas Chemical Complex (UGCC) states the following.

In accordance with the project, developed in 2000-2001, on the restoring of biodiversity of the Sudochye Lake, which is the subject of Ramsar Convention, the program for 2003-2022 was created.

Project "Sudochye" is a component of 1-(E) of an international project "Water supply to coastal areas of the Aral Sea and the environmental protection". Hence if the object "Sudochye" serves as a security facility of the environment through the water supply, the Soda factory and UGCC serve as facilities for economic development of the country. According to the similar chemical objects of Soviet period it is known, what negative influences on environment will be during the building and the further operation of UGCC. It is also necessary to notice that there are modern technologies for recycling of wastes. But at the same time at designing of such objects, such technologies cannot be considered, in connection with haste of performance of the project or with the lack of technology.

Therefore, for environmental contamination prevention, first of all, the guarantee at the state level is necessary, i.e. building and the further operation of UGCC should correspond to requirements of the State Ecological Examination and corresponding laws of RU and RK on nature protection, and in a case of not conformity to the requirements, it will lead to a project suspension.

The Chief of CMSL **J. Jumanazarov**

СП «Uz-Kor Gas Chemical»

А. Касымову

Комитет Управления Озером Судочье (КУОС) ознакомившись с планом строительства Устюртского Газо-Химического Комплекса (УГХК), заявляет следующее.

В соответствии с проектом, разработанному в 2000-2001 гг., по восстановлению биоразнообразия озера Судочье, которая является объектом Конвенции Рамсар, составлена программа на 2003-2022 гг.

Проект «Судочье» является компонентом 1-(Е) международного проекта «Обеспечение водой прибрежных районов Арала и охрана окружающей среды». Значит если объект «Судочье» служит средством охраны природы посредством снабжения водой, то Содовый завод и УГХК служат средством для развития экономики страны. По аналогичным химическим объектам советских времен знаем, какие будут отрицательные воздействия на окружающую среду при строительстве и дальнейшей эксплуатации УГХК. Надо также отметить, что существуют современные технологии по утилизации отходов. Но в то же время при проектировании таких объектов могут быть не учитаны такие технологии в связи с поспешностью выполнения проекта или с нехваткой техники.

Поэтому, для предотвращения загрязнения окружающей среды, в первую очередь нужна гарантия на государственном уровне, т.е. строительство и дальнейшая эксплуатация УГХК должна соответствовать требованиям Государственной Экологической Экспертизы и соответствующим законам РУ и РК по охране природы, а в случае не соответствия требованиям, то приостановка проекта.

Начальник КУОС Ж. Жуманазаров

Translation:

State Joint Stock Railroads Company
"UZBEKISTAN TEMIR YOLLARI"

KUNGRAT REGIONAL RAILROAD JUNCTION

No 2
Date: 19.01.09

TECHNICAL TERMS AND CONDITIONS

For performing spur track conjunction of
Gas chemical complex on the Kirkkiz station

We hereto propose to implement spur track conjunction of gas chemical complex on the Kirkkkiz station and turnout track No9 (continue of deadlock). Conjunction crossing point shall be P-50, but not less than 1/9 grade; rails for turnout deadlock shall be P-50 type having wooden sleepers. Length of turnout track No9 is 120 meters. Sleepers diagram is minimal.

Chief Engineer
Kungrat Regional Railroad junction: **Rabayev K.A.**

To: **Orinbaev O.Yu.**
First Deputy Chairman of
JV "UzKorGasChemical " LLC

No 06 24/827
Date: 07.07.08

With reply to your letter No 32 dated 03.07.08

Attached please find technical terms and conditions submitted by "Urgenchtransgaz" Subsidiary Company, for performing estimation of the preliminary feasibility-study of gas chemical complex project.

Chief Engineer **Hvan G.E.**

O'ZBEKISTON RESPUBLIKASI
«O'ZBEKNEFTGAZ»
MILLIY XOLDING KOMPANIYASI
«O'ZTRANSGAZ»
AKSIYADORLIK KOMPANIYASI
«URGANCHTRANSGAZ»
SHO'BA KORXONASI

REPUBLIC OF UZBEKISTAN
«UZBEKNEPHTEGAZ»
NATIONAL HOLDING COMPANY
«UZTRANSGAZ»
JOINT-STOCK COMPANY
«URGENCHTRANSGAZ»
BRANCH ENTERPRISE

220000, Xorazm viloyati, Urganch shahri, A.German ko'chasi - 13 uy. ☎: 226-36-98, 226-50-26 Teleks "KRAN" 285186 Faks: 224-29-27
220000, Хорезмская обл. г. Ургенч, ул. А. Герман - 13 ☎: 226-36-98, 226-50-26 Телекс "КРАН" 285186 Факс: 224-29-27

07.04.11 № 06-24/583

Заместителю председателя
СП ООО " Uz-Kor Gas Chemical"
Абдурасулову Ф.Р.

На Ваш № 01-4/07.121
от 09.03.2011 г.

ДП « Ургенчтрансгаз» направляет Вам запрашиваемую информацию по годовому отпуску воды от Кунградского УТВС с 1998 года по 2010 год.

Информация прилагается в приложении № 1.

Директор **И.Ю. Карабаев**

Technical terms and conditions for water supply of gas chemical complex construction on the Northern-East side of Akchalok settlement

1. It is to be considered in the design the off-line (independent) water supply system by construction of water pipeline looping "rise No3 of Service water supply department (SWSD) - Akchalok" as per diameter in the calculation.
2. As a tie-in point of water line there should be selected the discharge header on pump station rise No3 of Kungrat Service Water Supply Department (SWSD); either carry out tie-in to operating water line D1220 "Kungrat Karakalpakiya" after metering point on the process site area of SWSD on the area of pumphouse of rise No 3 and installation of appropriate shut-off and regulating valve.
3. It is be considered by design the reconstruction of metering point on process area of pumphouse of rise No 3 Kungrat SWSD, and also separate counting for water pipeline looping.
4. Due to increase of water consumption volume to 2.5 times and complete wear-out of main pump stock, it is to be considered by design the re-equipping the pump stations of rise No 0, 2, 3.
    a) **To equip pump station of rise 0**
    with pumping unit of OG5-70M - 1 package
    b) **To equip pump station of rise 2**
        - with pumping units of D3200-75 - 2 packages
        - with emergency pumping units of SNSG850-240- 2 packages
        - with electrical engine with capacity of 1600 KW, 1000 rpm for pumping unit of D4000-95
    c) **To equip pump station of rise 3**
        - with pumping units of SNSG850-600 - 3 packages
        - with emergency pumping units of SN-1000-180–3 – 2 packages
        -
5. For the purpose of providing reliable water supply it should be performed reconstruction of **floating Pump Station No1** by installing a crossbar D 700mm - 30 m between pontoon bridges.
6. It is to be considered in the design to carry out complete replacement of shut-off and block valves on Pump Stations of rise No2 and No3 of SWSD due to its complete tear-and-wear.
7. Due to caused emergency condition of cable lines necessary to replace KL 6kv on the pump stations rise No2 and No3 of SWSD.
8. As water in low volumes is outflowing in Amudarya River and water consumption in high volume, it is necessary consider in the design the principal availability of circulating water supply for production purposes of gas chemical complex project; and also construction of emergency and fire water tanks as per volume specified in the project.
9. It is to be considered by design equipment for decontaminating the treated water in order to use it as service and potable purposes.

"Urgenchtransgaz" Subsidiary company hereto informs that in case if all those specified above technical terms and conditions are executed, required volume of water shall be provided as soon as sufficient water is flowed in Amudarya River on the place of water basin. And also Company proposes to consider operational issues of complex for the period when there is water is in low volume in the source itself in the present project.

Chief Engineer **Hvan G.E.**

No06-07/72
Date: 13.01.09

To: Orinbaev O.Yu.
First Deputy Chairman of
JV "UzKorGasChemical" LLC

Copy: Otegenov K.
Head of Department
Akchalok mains gas pipeline

TECHNICAL TERMS AND CONDITIONS

for Tie-in of gas pipeline from gas chemical complex into main gas pipeline (MGP) Lever SAT-2 of the circuit of Akchalok MGP Department

I. Main gas pipelines and water pipelines

1. Tie-in shall be performed into Main Gas Pipeline Lever SAT-2 and on the outlet of Compressor station, according to effective Codes and Standards –KMK. (tie-in point should be clarified during investigation activities).
2. Definition of running gas pipeline:

	1 circuit
Diameter of pipe, mm	1220
Wall thickness of pipe, mm	12.0
Pressure supplied to tie-in point, kg/sm2	
Summer mode	29,0
Winter mode	43,0
Gas temperature, degree C.	
Winter season	+25
Summer season	+35
Depth of Laying, m	1.0
Insulation	Polymeric

3. Tie-in of lead Gas Pipeline shall be performed with operating gas pipeline by installing necessary block valve and gas flow metering point at the tie-in point.
4. Work schematic diagrams of tie-in point should be coordinated with "Urgenchtransgas" Subsidiary company.
5. Validity of Technical terms and conditions is 2 years after issued date.

Chief Engineer **Hvan G.E.**

State Joint Stock Company
"UZBEKENERGO"
of the Republic of UZBEKISTAN

No PP-01-21/147
Date:15.01.2009

To: **Orinbayev O.Yu.**
First Deputy Chairman of JV "Uz-KorGas Chemical" LLC

Malyuge V.G.
Chief Engineer of OJSC
"Sredaznergosetproject"

Djahsimov H.
Chief Engineer of OJSC
"Karakalpakelektroset"

Juraev B.I.
Chief Engineer of OJSC
"Tahiatash HGSS"

State Joint Stock Company "Uzbekenergo" hereby is forwarding to You preliminary technical terms and conditions for external power supply system of gas chemical complex (with design load capacity of 25 MW, I-category feeder per power supply reliability), that is considered in design for construction on Akchalok settlement of Kungrad district located in the Republic of Karakalpakstan.

In order to supply power to Gas Chemical Complex from own Power supply Systems network, it is necessary to consider in the design:

1.1 Facility on the S/S 110 kV of Kungrad Soda Plant Coat 220 kV with installation of autotransformers with required capacity and 220kV switches in transformers circuits.

1.2 Change over HVL 110 kV of Tahiatash HSS – KSP S/S 110 kV to 220kV voltage by extending it in necessary volume of ORU 220 kV of Tahiatash HGSS.

1.3 Facility in GCC area provided with two transformers Substation 110/10(6) kV with switches 110 kV in transformers circuits for GCC.

1.4 Facility for two High Voltage Lines 110 kV from Kungrad Soda Production Plant S/S 220 kV up to GCC S/S 110 kV.

1.5 Starting HVL 110 kV L-Tuley-1,2 on KSP 220 kV S/S.

1.6 Reconstruction and extension of S/S 110 kV of ORU KSP 220 kV up to necessary volume.

1.7 Off-line mode source of power supply with available electrical receivers of special group of 1st category.

1.8 Installation of automatic counting system of power supply for KSP S/S 220 kV by transferring the data to SC "Karakalpakelektroset" Subsidiary company.

1.9 It is proposed consider in the design below mentioned:

- teleautomatics of 220 kV coat and new tie-in points of S/S 110 kV of Kungrad SPP by installing dedicated necessary measurement transmitters and teledata broadcasting to Subsidiary company "Karakalpakelektroset" and Tahiatash HGSS along with National Dispatcher Operator Center (NDOC) of State company "Uzbekenergo";
- teleautomatics 110 kV Substation and telecasting of information to "Karakalpakelektroset" Subsidiary company and Tahiatash Heat Generation and Supply station;
- communication channels by reserving on High voltage lines (HVL) and release to S/S 220 kV of Kungrad SP, Tahiatash HGSS towards GCC 110 kV S/S – KSP 220 kV S/S – Tahiatash HGSS – SC OJSC "Karakalpakelektroset";
- channels for data transferring of Automatic system for power controlling and counting, organization for linear operational radio communication;
- facility for locating and reserve power supply to designed equipment of Dispatcher and Technology Controlling Devices (DTCD) on 110 kV S/S of Gas chemical complex; installation of air-conditioner on the communications central of projecting site;
- reserve communication line on networks of authorities or telecommunication of Automatic Control System of Republic of Uzbekistan.

In order to determine engineering-and-economical performance and consideration of other versions of power supply to gas chemical complex on the Akchalok settlement area located in Republic of Karakalpakstan, it is recommended to make request order to "Sredazenergosetproject" Joint Stock Company for designing and development of circuit Diagram of external power supply.

Deputy Chairman of Board **R.O.Raimov.**

INTERSTATE COORDINATION WATER COMMISSION OF CENTRAL ASIA
BVO "AMUDARYA"

No 152/ 03
Date: 01.07.2010

With reference to your No 214 dated 28.06.2010

To: Chairman of Board
JV "Uz-Kor Gas Chemical" LLC

BVO "Amudarya" hereby informs you by the following items:

1. In regard of chemical composition of Amudarya river.

- BVO "Amudarya" is currently carrying out the observation activities for the water quality at two points of Amudarya river;
- The distance between Kelif and the Birat (the old name is Darganata) gauging stations at middle course of the Amu Darya River is 546 km;
- in case of the lower course of Amudarya river from gauging point Tuyamuyun until the GS Samanbay the distance area of the station is 235 km. Tuyamuyun hydroscheme with three water reservoirs, which have great affect on quality of water composition, is located between the middle course and lower course of the Amudarya river. For informatioan, the water is delivered from Tuyamuyin hydroscheme to the lower course of Amudarya river.
- in case of the middle course of Amudarya river, the analysis of water quality is carried out on the base of 12 parameters: (pH, smell, colorness, HCO3, K+Na, Mg, Ca++, solid residue, common hardness, permanent hardness, Chlorides, Sulphates).
- in case of the lower course of Amudarya river, the analysis of water quality is carried out on the base of 6 patameters: (colorness, Mg, Ca, solid residue, common hardness).

  It should be noted that the quality of water is mainly changed to the worse from top to downward throughout the length of river. E.g. at inlet of middle course the solid residue depending on water content and month of year, is at the range of 0,3-1,0 g/l, at start point of lower course, the solid residue is within the limits of 0,5-1,5 g/l, then at the GS Samanbay which is located at 11 km lower side of Tahiatash hydro engineering facility, the solid residue varies within the limits of 0,6-2,2 g/l. The Samanbay gauging station is located approximately 100 km higher from GS Kzyldjar (this is oriented place of location of your water reserve facility). Chemical analysis for water quality are not performed by the company at this gauging station. In order to estimate evaluation of the water quality at your water reserve facility the data in relation with Samanbay GS may be used is our assumption. The following table describes the chemical analysis of water at GS Samanbay under minimum and maximum values.

	pH	Smell	Colorness	HCO3	Mg	Ca	Solid	Common

							residue	hardness
		Point		g/l	g/l	g/l	g/l	g/l
Min.	6	0	Colorless	0,15	0,022	0,052	0,6	6,5
Max.	8	1	Light brown	0,25	0,098	0,18	2,2	17,6

More accurate and extended chemical analysis on river water made at the GS Kzyldjar are available at Uzhydrometereology agency of the Republic of Uzbekistan.

2. In concern of average water consumption at the area of river Tahiatash hydro engineering facility – GS Kzyldjar.
   Water consumption in average decade (ten-day period) at GS Samanbay and Kzyldjar are attached by separate page.

Head of BVO “Amudarya” B.Kdyrniyazov

M.2. Minutes of Meetings

M.2.1. Archaeology and Ethnography

Representatives from

- - Uz-Kor (UK)
- - Mott MacDonald (MM)
- - Institute of History, Archaeology and Ethnography, Uzbek Academy of Sciences (AE)

Topic of Meeting – Surgil Gas Chemical Project

AE – Had indicated no initial concerns to potential impacts upon known archaeological features within the area

AE - not aware of any known archaeological features within the boundary of the former Aral Sea that may be impacted upon by either gas drilling activities or pipeline construction across the Surgil Field toward the escarpment at Urga to the south west

AE – Indicated that no extended archaeological studies in the bed of the sea were known to you

UK – requested confirmation of the above

UK – understands that the only known existing archaeological features in relative close proximity to the Project site are the historic burial grounds.

UK – requests formal opinion risk of the Project to known archaeological features on the Plateau

UK – Proposed that proposes that a representative of the Institute accompanies Uz-Kor on a reconnaissance drive along the proposed pipeline route to offer the best means of clarifying the absence of any known cultural heritage features in the proximity of the proposed pipeline route

UK – Proposed to facilitate an archaeological ‘watching brief’ to attend all excavation works during the Project construction phase

M.2.2. Ministry of Agriculture and Water Resources

Representatives from

- - Uz-Kor (UK)
- - Mott MacDonald (MM)
- - Ministry of Agriculture and Water Resources (AW)

Topic of Meeting – Surgil Gas Chemical Project

UK – provided overview of project and key information relating to water abstraction, pipelines and water demand

UK – Understands that the Kungrad WSU has been designed to provide a maximum raw water supply of 125,000 m^3/day. At peak conditions, the UGCC will only require approximately 19% (17,400 m^3/day) of the reserve capacity.

UK - understands that the Sudoch'ye Lake System is fed by a drainage canal, with water flows into the canal from the Amu Darya controlled via sluice operations at Takhitash, near to Nukus. When water levels in the Sudoch'ye system are high, the Sudoch'ye Dam is opened to allow releases to the area north of the Sudoch'ye Lake system.

UK & MM – Understands that AW agrees with this conclusion

AW – Outlined a number of strategies aimed at reducing the volume of water diverted for agricultural irrigation purposes.

AW – Indicated to UK that a policy is in place to encourage a reduction I the intensity of water use use associated with agriculture is embodied within a number of Laws and Resolutions of the Republic

AW, UK & MM - that the strategies provide an opportunity to offset the relatively small abstractions of the Project against larger savings made as a result of policy aimed at decreasing agricultural demands upon the Amu Darya River. As such, it is Uz-Kor's opinion that the Project will result in no net loss of water from flows downstream of the intended abstraction points.

UK – requested formal response from discussions with AW on the following

- The official opinion of the Ministry as to whether it considers that the Project will result in a significant negative impact or not upon water customers downstream of either the supply abstraction point at the Kungrad WSU or Nukus-Tuyumuyun WSU;
- The official opinion of the Ministry as to whether it considers that the existing water supply infrastructure has the capacity to accommodate the Project water demands;
- The official opinion of the Ministry as to whether Project abstractions will not impact upon the lake system at Sudoch'ye;
- A commitment by the Ministry of Agriculture and Water Resources that Project water abstractions will be more than offset by savings made elsewhere in line with the strategic objectives of the Government of the Republic of Uzbekistan and Ministry of Agriculture and Water Resources, resulting in no net loss of water from the river as a result of the operation of the Project; and
- Clarification of those specific Laws and Resolutions of the Republic which set out objectives for reductions in water use by intensive agricultural operations.

- Details as to how the Ministry intends to implement it's strategies for water prioritisation and decrease use for agricultural irrigation purposes over the period of the Project, together with projections of water savings to be achieved via these strategies in order that the Project can factually demonstrate to international investors that there will be no net loss from the Amu Darya River.

Appendix N. Air Quality

N.1. Component 1 Upstream: Surgil Gas Field and Complex Gas Treatment Unit

Table N.1: Significance of Impacts at Modelled Receptors for 30 minute NO_2 Concentrations ($\mu g/m^3$)

Receptor	Baseline Concentration	Project Scenario	NO_2 Increase	% Change of Standard	Magnitude	Receptor Sensitivity	Significance
CGTU Control Post	5.1	26.9	21.8	25.6	Major	Negligible	Insignificant
CGTU Residential 1	4.9	25.8	20.9	24.6	Moderate	Negligible	Insignificant
CGTU Residential 2	4.9	26.1	21.2	25.0	Moderate	Negligible	Insignificant
CGTU Residential 3	4.9	24.5	19.6	23.1	Moderate	Negligible	Insignificant
CGTU Residential 4	4.7	22.1	17.4	20.5	Moderate	Negligible	Insignificant
CGTU Residential 5	4.8	23.3	18.5	21.7	Moderate	Negligible	Insignificant
CGTU Residential 6	4.7	24.6	19.7	23.5	Moderate	Negligible	Insignificant

Table N.2: Significance of Impacts at Modelled Receptors for 1 Hour NO_2 Concentrations ($\mu g/m^3$)

Receptor	Baseline Concentration	Project Scenario	NO_2 Increase	% Change of Standard	Magnitude	Receptor Sensitivity	Significance
CGTU Control Post	3.9	20.7	16.8	8.4	Minor	Negligible	Insignificant
CGTU Residential 1	3.8	19.9	16.1	8.0	Minor	Negligible	Insignificant
CGTU Residential 2	3.8	20.1	16.3	8.2	Minor	Negligible	Insignificant
CGTU Residential 3	3.8	18.9	15.1	7.5	Minor	Negligible	Insignificant
CGTU Residential 4	3.7	17.0	13.4	6.7	Minor	Negligible	Insignificant
CGTU Residential 5	3.7	17.9	14.2	7.1	Minor	Negligible	Insignificant
CGTU Residential 6	3.6	19.0	15.4	7.7	Minor	Negligible	Insignificant

Table N.3: Significance of Impacts at Modelled Receptors for 1 Hour 99.79th Percentile NO_2 Concentrations ($\mu g/m^3$)

Receptor	Baseline Concentration	Project Scenario	NO_2 Increase	% Change of Standard	Magnitude	Receptor Sensitivity	Significance
CGTU Control Post	2.9	15.0	12.1	6.1	Minor	Negligible	Insignificant
CGTU Residential 1	2.8	14.4	11.6	5.8	Minor	Negligible	Insignificant
CGTU Residential 2	2.8	14.1	11.3	5.7	Minor	Negligible	Insignificant
CGTU Residential 3	2.8	13.9	11.1	5.6	Minor	Negligible	Insignificant
CGTU Residential 4	2.9	15.0	12.1	6.1	Minor	Negligible	Insignificant
CGTU Residential 5	2.7	12.9	10.3	5.1	Minor	Negligible	Insignificant

Receptor	Baseline Concentration	Project Scenario	NO_2 Increase	% Change of Standard	Magnitude	Receptor Sensitivity	Significance
CGTU Residential 6	2.7	13.8	11.1	5.5	Minor	Negligible	Insignificant

Table N.4: Significance of Impacts at Modelled Receptors for 24 Hour NO_2 Concentrations ($\mu g/m^3$)

Receptor	Baseline Concentration	Project Scenario	NO_2 Increase	% Change of Standard	Magnitude	Receptor Sensitivity	Significance
CGTU Control Post	1.9	10.8	8.9	14.9	Minor	Negligible	Insignificant
CGTU Residential 1	1.9	10.4	8.5	14.1	Minor	Negligible	Insignificant
CGTU Residential 2	1.9	10.1	8.2	13.6	Minor	Negligible	Insignificant
CGTU Residential 3	1.9	10.3	8.4	14.0	Minor	Negligible	Insignificant
CGTU Residential 4	1.9	9.4	7.5	12.4	Minor	Negligible	Insignificant
CGTU Residential 5	1.9	8.9	7.0	11.6	Minor	Negligible	Insignificant
CGTU Residential 6	1.8	8.4	6.6	11.0	Minor	Negligible	Insignificant

Table N.5: Significance of Impacts at Modelled Receptors for 1 Month NO_2 Concentrations ($\mu g/m^3$)

Receptor	Baseline Concentration	Project Scenario	NO_2 Increase	% Change of Standard	Magnitude	Receptor Sensitivity	Significance
CGTU Control Post	0.5	2.6	2.1	4.2	Negligible	Negligible	Insignificant
CGTU Residential 1	0.5	2.5	2.0	4.1	Negligible	Negligible	Insignificant
CGTU Residential 2	0.5	2.5	2.0	4.0	Negligible	Negligible	Insignificant
CGTU Residential 3	0.5	2.5	2.0	4.1	Negligible	Negligible	Insignificant
CGTU Residential 4	0.5	2.4	1.9	3.8	Negligible	Negligible	Insignificant
CGTU Residential 5	0.4	2.3	1.8	3.6	Negligible	Negligible	Insignificant
CGTU Residential 6	0.4	2.3	1.8	3.7	Negligible	Negligible	Insignificant

Table N.6: Significance of Impacts at Modelled Receptors for Annual NO_2 Concentrations ($\mu g/m^3$)

Receptor	Baseline Concentration	Project Scenario	NO_2 Increase	% Change of Standard	Magnitude	Receptor Sensitivity	Significance
CGTU Control Post	0.2	1.3	1.1	2.7	Negligible	Negligible	Insignificant
CGTU Residential 1	0.2	1.3	1.1	2.6	Negligible	Negligible	Insignificant
CGTU Residential 2	0.2	1.3	1.1	2.6	Negligible	Negligible	Insignificant
CGTU Residential 3	0.2	1.3	1.1	2.6	Negligible	Negligible	Insignificant
CGTU Residential 4	0.2	1.2	1.0	2.5	Negligible	Negligible	Insignificant

Receptor	Baseline Concentration	Project Scenario	NO_2 Increase	% Change of Standard	Magnitude	Receptor Sensitivity	Significance
CGTU Residential 5	0.2	1.1	0.9	2.4	Negligible	Negligible	Insignificant
CGTU Residential 6	0.2	1.2	1.0	2.5	Negligible	Negligible	Insignificant

N.2. Component 2 – Downstream: Ustyurt Gas Chemical Complex

Table N.7: Significance of Impacts at Modelled Receptors for 30 Minute NO_2 Concentrations ($\mu g/m^3$)

Receptor	Baseline Concentration	Project Scenario	NO_2 Increase	% Change of Standard	Magnitude	Receptor Sensitivity	Significance
Existing Akchalak Settlement 1	23.6	23.6	0.0	0.0	Negligible	Negligible	Insignificant
Existing Akchalak Settlement 2	22.3	22.4	0.0	0.0	Negligible	Negligible	Insignificant
Existing Akchalak Settlement 3	16.5	17.2	0.7	0.8	Negligible	Negligible	Insignificant
Existing Akchalak Settlement 4	17.6	18.5	0.9	1.0	Negligible	Negligible	Insignificant
Existing Akchalak Settlement 5	20.3	20.3	0.0	0.0	Negligible	Negligible	Insignificant
Akchalak UGCC Accommodation 1	25.7	25.7	0.0	0.0	Negligible	Negligible	Insignificant
Akchalak UGCC Accommodation 2	17.7	20.7	3.0	3.5	Negligible	Negligible	Insignificant
Akchalak UGCC Accommodation 3	22.3	22.3	0.0	0.0	Negligible	Negligible	Insignificant
Akchalak UGCC Accommodation 4	29.5	29.5	0.0	0.0	Negligible	Negligible	Insignificant
Akchalak UGCC Accommodation 5	18.4	18.4	0.0	0.0	Negligible	Negligible	Insignificant

Table N.8: Significance of Impacts at Modelled Receptors for 1 Hour NO_2 Concentrations ($\mu g/m^3$)

Receptor	Baseline Concentration	Project Scenario	NO_2 Increase	% Change of Standard	Magnitude	Receptor Sensitivity	Significance
Existing Akchalak Settlement 1	18.1	18.2	0.0	0.0	Negligible	Negligible	Insignificant
Existing Akchalak Settlement 2	17.2	17.2	0.0	0.0	Negligible	Negligible	Insignificant
Existing Akchalak Settlement 3	12.7	13.2	0.6	0.3	Negligible	Negligible	Insignificant
Existing Akchalak Settlement 4	13.6	14.2	0.7	0.3	Negligible	Negligible	Insignificant
Existing Akchalak Settlement 5	15.6	15.6	0.0	0.0	Negligible	Negligible	Insignificant
Akchalak UGCC Accommodation 1	19.8	19.8	0.0	0.0	Negligible	Negligible	Insignificant
Akchalak UGCC Accommodation 2	13.6	15.9	2.3	1.1	Negligible	Negligible	Insignificant
Akchalak UGCC Accommodation 3	17.2	17.2	0.0	0.0	Negligible	Negligible	Insignificant

Receptor	Baseline Concentration	Project Scenario	NO_2 Increase	% Change of Standard	Magnitude	Receptor Sensitivity	Significance
Akchalak UGCC Accommodation 4	22.7	22.7	0.0	0.0	Negligible	Negligible	Insignificant
Akchalak UGCC Accommodation 5	14.1	14.2	0.0	0.0	Negligible	Negligible	Insignificant

Table N.9: Significance of Impacts at Modelled Receptors for 1 Hour 99.79th Percentile NO_2 Concentrations (µg/m^3)

Receptor	Baseline Concentration	Project Scenario	NO_2 Increase	% Change of Standard	Magnitude	Receptor Sensitivity	Significance
Existing Akchalak Settlement 1	14.4	14.4	0.0	0.0	Negligible	Negligible	Insignificant
Existing Akchalak Settlement 2	12.7	12.7	0.0	0.0	Negligible	Negligible	Insignificant
Existing Akchalak Settlement 3	10.7	10.7	0.0	0.0	Negligible	Negligible	Insignificant
Existing Akchalak Settlement 4	11.0	11.1	0.1	0.1	Negligible	Negligible	Insignificant
Existing Akchalak Settlement 5	12.2	12.3	0.1	0.1	Negligible	Negligible	Insignificant
Akchalak UGCC Accommodation 1	15.7	15.7	0.0	0.0	Negligible	Negligible	Insignificant
Akchalak UGCC Accommodation 2	11.4	11.5	0.1	0.0	Negligible	Negligible	Insignificant
Akchalak UGCC Accommodation 3	13.3	13.3	0.0	0.0	Negligible	Negligible	Insignificant
Akchalak UGCC Accommodation 4	18.5	18.5	0.0	0.0	Negligible	Negligible	Insignificant
Akchalak UGCC Accommodation 5	11.1	11.2	0.1	0.1	Negligible	Negligible	Insignificant

Table N.10:Significance of Impacts at Modelled Receptors for 24 Hour NO_2 Concentrations (µg/m^3)

Receptor	Baseline Concentration	Project Scenario	NO_2 Increase	% Change of Standard	Magnitude	Receptor Sensitivity	Significance
Existing Akchalak Settlement 1	7.8	7.9	0.0	0.0	Negligible	Negligible	Insignificant
Existing Akchalak Settlement 2	5.0	5.0	0.0	0.0	Negligible	Negligible	Insignificant
Existing Akchalak Settlement 3	4.0	4.1	0.0	0.0	Negligible	Negligible	Insignificant
Existing Akchalak Settlement 4	5.8	5.8	0.0	0.0	Negligible	Negligible	Insignificant
Existing Akchalak Settlement 5	6.5	6.5	0.0	0.0	Negligible	Negligible	Insignificant
Akchalak UGCC Accommodation 1	7.3	7.4	0.0	0.0	Negligible	Negligible	Insignificant
Akchalak UGCC Accommodation 2	5.0	5.0	0.0	0.0	Negligible	Negligible	Insignificant
Akchalak UGCC Accommodation 3	5.8	5.9	0.0	0.0	Negligible	Negligible	Insignificant
Akchalak UGCC Accommodation 4	9.3	9.3	0.0	0.0	Negligible	Negligible	Insignificant
Akchalak UGCC Accommodation 5	5.9	5.9	0.0	0.0	Negligible	Negligible	Insignificant

Table N.11: Significance of Impacts at Modelled Receptors for 1 Month NO_2 Concentrations ($\mu g/m^3$)

Receptor	Baseline Concentration	Project Scenario	NO_2 Increase	% Change of Standard	Magnitude	Receptor Sensitivity	Significance
Existing Akchalak Settlement 1	1.7	2.0	0.3	0.5	Negligible	Negligible	Insignificant
Existing Akchalak Settlement 2	1.9	2.1	0.1	0.2	Negligible	Negligible	Insignificant
Existing Akchalak Settlement 3	1.6	1.7	0.1	0.3	Negligible	Negligible	Insignificant
Existing Akchalak Settlement 4	1.4	1.7	0.3	0.6	Negligible	Negligible	Insignificant
Existing Akchalak Settlement 5	1.7	1.8	0.1	0.3	Negligible	Negligible	Insignificant
Akchalak UGCC Accommodation 1	2.8	2.8	0.1	0.2	Negligible	Negligible	Insignificant
Akchalak UGCC Accommodation 2	1.8	1.9	0.1	0.2	Negligible	Negligible	Insignificant
Akchalak UGCC Accommodation 3	2.0	2.0	0.1	0.1	Negligible	Negligible	Insignificant
Akchalak UGCC Accommodation 4	2.0	2.3	0.3	0.5	Negligible	Negligible	Insignificant
Akchalak UGCC Accommodation 5	1.4	1.8	0.4	0.7	Negligible	Negligible	Insignificant

Table N.12: Significance of Impacts at Modelled Receptors for Annual NO_2 Concentrations ($\mu g/m^3$)

Receptor	Baseline Concentration	Project Scenario	NO_2 Increase	% Change of Standard	Magnitude	Receptor Sensitivity	Significance
Existing Akchalak Settlement 1	0.9	1.3	0.4	1.1	Negligible	Negligible	Insignificant
Existing Akchalak Settlement 2	0.9	1.4	0.4	1.0	Negligible	Negligible	Insignificant
Existing Akchalak Settlement 3	0.7	1.2	0.5	1.2	Negligible	Negligible	Insignificant
Existing Akchalak Settlement 4	0.7	1.2	0.5	1.3	Negligible	Negligible	Insignificant
Existing Akchalak Settlement 5	0.8	1.2	0.5	1.2	Negligible	Negligible	Insignificant
Akchalak UGCC Accommodation 1	0.9	1.3	0.4	1.1	Negligible	Negligible	Insignificant
Akchalak UGCC Accommodation 2	0.6	1.2	0.6	1.5	Negligible	Negligible	Insignificant
Akchalak UGCC Accommodation 3	0.8	1.3	0.5	1.2	Negligible	Negligible	Insignificant
Akchalak UGCC Accommodation 4	1.1	1.5	0.4	1.0	Negligible	Negligible	Insignificant
Akchalak UGCC Accommodation 5	0.7	1.2	0.5	1.3	Negligible	Negligible	Insignificant

Appendix O. DQRA



Detailed Quantitative Risk Assessment

Toxic Dust Exposure

November 2011
Uz-Kor Gas Chemical

Uz-Kor Gas Chemical

Mott MacDonald

Detailed Quantitative Risk Assessment

Toxic Dust Exposure

November 2011

Uz-Kor Gas Chemical

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Content

1. Introduction

1.1 Overview

The recent Environmental and Social Impact Assessment[i] (ESIA) for the Surgil Gas Field project assessed potential risks from contaminated ground in the vicinity of the project sites. The ESIA assessment followed a recognised evaluation framework which can be summarised as follows:

Stage 1 Preliminary Risk Assessment
- Assessment of geo-environmental setting of project
- Definition of contamination conceptual model to assess potential contamination sources, pathways and receptors
- Assessment of potentially viable exposure pathways

Stage 2 Generic Quantitative Risk Assessment
- Collation of chemical test data from intrusive ground investigation[ii]
- Evaluation of chemical data against authoritative risk assessment thresholds (national and international) including thresholds derived assuming generic exposure pathways.

As the risk assessment progressed from stages 1 to 2, and the risk modelling incorporated the site specific input parameters from the ground investigation survey, the level of uncertainty decreases.

Contamination risk assessment thresholds should be authoritative and reflect the health policy of the host country. As such, the following thresholds were utilised in the stage 2 of the ESIA risk assessment:

- Uzbekistan MPCs: Nationally recognised soil assessment thresholds
- Dutch Intervention Values published by the Dutch Ministry for social building, regional planning, and environment administration (VROM, 2009); and
- Canadian Environmental Quality Guidelines (CEQG) published by the Canadian Council of Ministers of the Environment (CCME, 2011)[iii].

Table 1.1 summaries the risk assessment thresholds used in the ESIA risk assessment:

Table 1.1: Assessment Thresholds used in ESIA

Parameter	Units	Local MPC	CCME (residential)	Dutch*	
				Intervention Value	Target Value
Arsenic	mg/kg	2.0	12	76	29
Cadmium	mg/kg	2.0	10	13	0.8
Chromium	mg/kg	6.0	64	380	100
Copper	mg/kg	3.0	63	190	36
Iron	mg/kg	-	-	-	-
Lead	mg/kg	32.0	140	530	85
Mercury	mg/kg	2.1	-	4**	0.3
Nickel	mg/kg	4.0	50	100	35
Selenium	mg/kg	0.5	1	-	-
Zinc	mg/kg	23.0	200	720	140
Cyanide	mg/kg	-	0.9	20 (free) 50 (complex)	- -
DDE	mg/kg	0.5 (total)	0.7 (total)	2.3	-
DDD	mg/kg			34	-
DDT	mg/kg			1.7	-
Mineral Oil	mg/kg	0.03	1700-2500	5000	-

* for a 'Standard Soil' with 10% organic matter

** for organic mercury

While the scientific basis for the Uzbekistan MPCs is unclear, these standards reflect the environmental policy of the project Country. As such, these standards form a key and essential element in the project contamination risk assessment presented in the ESIA.

The Dutch and Canadian criteria are recognised by the international risk assessment community and project stakeholders for their scientific robustness. Abundant background literature allows the user to determine the basis and applicability of such assessment criteria to any given project scenario.

The Dutch and Canadian thresholds may be regarded as Generic Assessment Criteria (GACs). They are modelled using exposure parameters based on generic residential land use assumptions involving contaminated exposure to children. While such assumptions do not necessarily reflect the exposure scenarios on the study site (where children will not be present), they were selected in the knowledge that they were likely to ensure a level of conservatism in the risk assessment. This Generic Risk Assessment approach is considered appropriate for high level studies, and necessarily conforms to IFC and National Guidance on Contaminated Land.

The findings of the ESIA assessment, based on the generic risk assessment criteria, showed that shallow soils in some areas of the Surgil Field contain DDT, an organo-chloride pesticide, at concentrations slightly exceeding national and international (Canadian and Dutch) human health criteria. Whilst in low levels, the ESIA highlighted that DDT may present a potential risk to the health of workers via inhalation, dermal contact or ingestion of airborne dusts and as a result the ESIA recommended a detailed quantitative risk assessment be conducted into the potential health risks associated with the contaminated land / dust to verify the level of risk at the site and identify any necessary mitigation. This report outlines the results of the subsequent detailed quantitative risk assessment undertaken.

1.2 Objectives of Study

This paper evaluates the contamination risk assessment criteria used in the ESIA against a refined site specific risk assessment model. This process of "Detailed Quantitative Risk Assessment" (DQRA) aims to reflect the exposure pathways and receptor profiles assumed to be present at the project sites, the output being a set of site specific DQRA thresholds. In doing so, the objective of this study is to assess whether the contaminant thresholds used in the ESIA are likely to be protective of human health risks at the project sites. The DQRA focused on all the contaminant parameters assessed in the ESIA, including pesticides, as defined in Table 1.

A further assessment of exceedances of the DQRA thresholds by samples extracted during the project ground investigation has also been undertaken. It is anticipated that a full interpretation of the DQRAs against soil contamination levels may be included in further revisions of the ESIA at client request.

2. Limitations

By using a recognised modelling framework and providing the modelling input parameters, the DQRA is intended to ascertain whether the generic thresholds used in the ESIA assessment are representative to project site area and to also provide verification of the findings of the Human Health Risk assessment presented in the ESIA. However the reader should be aware of the following limitations when reading this technical note:

- The DQRA has not involved collection of more contamination data from the site. The reader should refer to section 11.2.6 of the ESIA for a summary of uncertainties associated with spatial variations in contamination, and analytical testing capability
- The DQRA has not obtained any further data on the organic matter content and moisture content of the soils which can impact upon organic contamination mobility and exposure pathways.
- It has not been possible to model risks from exposure to lead, strontium, or cyanide. Therefore it has not been possible to verify the findings of the generic risk assessment presented in the ESIA for these determinants.
- Mineral oil data was obtained during the ground investigation. Mineral oil tests include a wide range of total petroleum hydrocarbons. Detailed Quantitative Risk Assessment cannot derive a single contamination threshold for Mineral Oil for comparison with the ground investigation data, due to the large variability in toxicity and physiochemical properties of hydrocarbon mixture. In order to represent variations in these properties DQRA thresholds have been derived for individual TPH fractions banded in accordance with the findings of the TPHCWG (1997)[iv].
- The DQRA does not consider the impacts of soil and vapour saturation on modelled risk assessment thresholds. Typically such impacts are not relevant where contamination occurs at the surface in the free phase. In the case of contaminants which exhibit a significant vapour pathway, the CLEA model is likely to over-estimate risks[v]. Consequently the DQRA thresholds for contaminants which exceed vapour saturation limits are likely to be conservative.
- The ESIA considered contamination risks for the following project sites:
    - The UGCC plant;
    - The proposed Waste Storage Site A (located north of the UGCC);
    - The proposed Waste Storage Site B (located south of the UGCC);
    - The waste water storage reservoir
    - Various Surgil Gas Wells; and
    - The CGTU.

There is insufficient detailed information to derive individual DQRA thresholds for each project site. Instead the modelling exercise has developed a single set of DQRA thresholds, based on assumed worst case, credible exposure scenarios for all of the above sites during operation.

3. Modelling Procedure

The DQRA presented in this document attempts to incorporate site specific exposure parameters to achieve a risk assessment that is representative of the project site. Modelling has been undertaken in accordance with the UK Contamination Land Exposure Assessment (CLEA) Framework[vi]. This Framework has been developed over the past 15 years by Nottingham University, the UK Environment Agency (EA), and the Department of the Environment Food and Rural Affairs (DEFRA). The model has undergone an extensive period of peer review by toxicologists, and contaminated land specialists, making it scientifically authoritative and defensible. The principal advantage of the CLEA model in DQRA is that it provides a high degree of control of a wide range of exposure parameters allowing these to be tailored to site specific conditions.

At the heart of detailed QRA is the matching of the following key variables:
- Health Criteria Values (HCVs)[vii] (mg/kg body weight/day)
- Average Daily Exposure (ADE) (mg/kg body weight/day)

$$\frac{HCV}{ADE} = 1$$

The CLEA model has been developed in accordance with UK health policy considerations although the majority of HCVs used in the model are derived from international studies. Under the CLEA Framework, HCVs are intended to be set at levels “of minimal and tolerable risk for long term human exposure to chemicals in soil” (Environment Agency, 2008)[vii]. Provided that Average Daily Exposure levels are below the Health Criteria Values, risks to human health are therefore likely to minimal or tolerable.

The outputs from the CLEA model are Detailed Qualitative Risk Assessment (DQRA) Thresholds for inhalation and ingestion exposure pathways. The lower of each threshold has been compared with the thresholds used in the ESIA and soil sample data to verify the findings of the initial risk assessment.

Where possible, CLEA model v.1.06 has been used to derive DQRA thresholds for different contaminants. However for certain contaminants this model has been unable to process the input parameters. For these contaminants, an earlier model, v1.03 has been used. This is not believed to have a significant impact on modelling the exposure pathways relevant to the current project.

3.1 Average Daily Exposure

Modelling the average daily exposure includes a wide range of parameters relevant to the project site. The CLEA model for commercial / industrial sites considers the following exposure pathways:
- Oral Routes:
  - Direct soil and dust ingestion
- Dermal Exposure Routes
  - Indoor dermal exposure
  - Outdoor dermal exposure
- Inhalation Routes
  - Indoor dust inhalation
  - Outdoor dust inhalation
  - Indoor vapour inhalation
  - Outdoor vapour inhalation

Model input parameters for each exposure route and receptor have been selected to be broadly applicable to the proposed uses of the project sites. The summary of the key assumed pathway and receptor variables (including all site specific parameters) are summarised below. Where sensitivity analysis has been performed on a range of values for a given input parameter, the chosen value is termed the "Site Specific Default". The CLEA model also contains default exposure parameters for the generic land use category "commercial / industrial". These are termed "CLEA Defaults".

Table 3.1: CLEA Model Input Parameters for DQRA

Key Input Parameters	Values	Assumptions
Receptors		
Age	16-62yrs	Assumed working age for site staff during plant(s) operation phase. Age range is appropriate to a commercial / industrial site. Exposure is averaged over full 16-62yr age range.
Indoor Occupancy period	Site Specific Parameter: 12 hrs per day	Conservative assumption for 12 hour period in living quarters used in site specific scenario.
Outdoor Occupancy period	Site Specific Parameter: 12 hrs per day	Conservative assumption for 12 hour shift outside used as site specific parameter. This is considered to represent the maximum plausible outdoor occupancy period.
Exposure Periods	169 days per year	Assumes 2 weeks on site, 2 weeks off site. Includes a 4 week holiday.
Soil Ingestion Rate	50mg/day	CLEA Default valuevi, also recommended by USEPA, (1997)viii
Pathways		
Soil Properties		
pH	7	Assumption
Soil Organic Matter	2.5%	Assumption
Porosity (total)	0.54	CLEA Defaultvi for sand
Porosity (water –filled)	Site Specific Default: 0.05; Sensitivity Analysis: 0 – 0.20	Range assumed to be appropriate for arid conditions. Residual water content for water held within particles fixed at 7%.
Ambient Soil Temperature	Site Specific Default: 283K; Sensitivity Analysis: 283K – 301K	283K: Annual average temperature (Central Asian Knowledge Portal, 2011)ix. Sensitivity analysis considers upper 95%ile wind speed data for Aral Sea.
Bulk Density	1.18g/cm3	CLEA defaultvi for sand
Building Properties: CLEA default for office (Post 1970s)		
Building Footprint	610m2	CLEA Defaultvi
Dust loading factor	100µg/m3	CLEA Defaultvi for PM10 concentration in air for commercial property.
Air Dispersion Model		
Threshold Value of wind speed at 10m	7.2m/sec	CLEA defaultvi for mobilisation of 500µm soil particles
Mean annual windspeed (at 10m)	Site Specific Default: 4.81m/sec Sensitivity analysis: 3.8 – 5.8m/sec	Default = Average windspeed at Aral Sea weather station, 1961 – 1965ix. Sensitivity analysis performed for lower and upper 95%ile records for Aral Sea (ref)
Fraction of Site With Hard vegetative Cover	Site Specific Default: 10% Sensitivity Analysis: 0 – 20%	Sensitivity range is assumed to include the likely range of hard or vegetative cover in an arid climate.
Vapour Model	CLEA Default parameters for office (Post 1970s)	Insufficient information to adjust vapour model parameters.
Chemical Data		
Health Criteria Values	Contaminant specific	Derived from following sources (in order of preference) HCVs published by UK Environment Agency in support of the CLEA modelx

Key Input Parameters	Values	Assumptions
		HCVs published by Land Quality Management and the Chartered Institute of Environmental Healthxi following peer review by toxicologists HCVs published by the Dutch National Institute of Public Health and the Environment under the RIVM programmexii.
Physiochemical Parameters	Contaminant specific	Derived from following sources (in order of preference) Physiochemical parameters published by UK Environment Agency in support of the CLEA modelx, xiii Physiochemical parameters published by Land Quality Management and the Chartered Institute of Environmental Healthxi following peer review by toxicologists Physiochemical parameters published by the Dutch National Institute of Public Health and the Environment under the RIVM programmexii.

4. DQRA Modelling Outputs

4.1 Site Specific Default Model

Table 4.1 summarises the Detailed Qualitative Risk Assessment Thresholds using Site Specific Default Parameters

Table 4.1: Site Specific Default Model Risk Assessment Thresholds

	DQRA Thresholds		Contribution of Exposure Pathways to Overall Exposure								
Determinant	oral HCV	inhalation HCV	direct soil ingestion	dermal contact (indoor)	dermal contact (outdoor)	inhalation of dust (indoor)	inhalation of dust (outdoor)	inhalation of vapour (indoor)	inhalation of vapour (outdoor)	oral background	inhalation background
	mg kg-1	mg kg-1	%	%	%	%	%	%	%	%	%
Arsenic	855.8	325.8	92.72	1.85	3.71	1.35	0.37	0.00	0.00	0.00	0.00
Cadmium	543.3	181.5	49.30	0.03	0.07	0.72	0.20	0.00	0.00	49.40	0.28
Mercury, elemental	NR	26.8	0.00	0.00	0.00	0.21	0.06	79.47	19.06	0.00	1.19
Mercury, inorganic	6004.1	9773.4	97.07	0.00	0.00	1.41	0.39	0.00	0.00	1.13	0.00
Mercury, methyl	561.6	2596.6	66.03	4.40	8.80	0.96	0.27	4.88	11.58	3.09	0.00
Nickel	29817.1	837.7	48.11	0.16	0.32	0.70	0.19	0.00	0.00	49.48	0.15
Selenium	17512.0	NR	90.49	0.00	0.00	1.31	0.37	0.00	0.00	7.83	0.00
Zinc	800411.0	NR	44.12	0.00	5.88	0.00	0.00	0.00	0.00	50.00	0.00
Copper	213496.8	107113.4	43.96	0.00	5.86	0.00	0.18	0.00	0.00	49.82	0.18
Chromium	8004.2	748.9	87.93	0.00	11.72	0.00	0.36	0.00	0.00	0.00	0.00
DDT	1330.2	NR	87.99	0.00	11.73	0.00	0.00	0.00	0.00	0.29	0.00
DDE	1292.1	NR	85.47	0.00	11.39	0.00	0.00	0.00	0.00	3.14	0.00
DDD	3922.1	NR	86.47	0.00	11.53	0.00	0.00	0.00	0.00	2.00	0.00
TPH Aliphatics >EC5-6	6673114.1	319.3	0.00	0.00	0.00	0.00	0.00	49.84	0.16	0.00	50.00
TPH Aliphatics >EC6-8	6673114.1	653.8	0.00	0.00	0.00	0.00	0.00	49.77	0.23	0.00	50.00
TPH Aliphatics >EC8-10	133340.5	138.6	0.02	0.00	0.00	0.00	0.00	49.54	0.44	0.02	49.98

	DQRA Thresholds		Contribution of Exposure Pathways to Overall Exposure								
TPH Aliphatics >EC10-12	133340.5	686.2	0.08	0.00	0.01	0.00	0.00	48.93	0.98	0.09	49.91
TPH Aliphatics >EC12-16	133340.5	3057.9	0.35	0.00	0.05	0.00	0.00	47.57	2.03	0.40	49.60
TPH Aliphatics EC16-21	2668055.6	NR	44.12	0.00	5.88	0.00	0.00	0.00	0.00	50.00	0.00
TPH Aromatics >EC8-10	53374.2	214.0	0.12	0.00	0.02	0.00	0.00	48.64	1.22	0.14	49.86
TPH Aromatics >EC10-12	53374.2	1117.6	0.64	0.00	0.09	0.00	0.00	46.56	2.72	0.72	49.28
TPH Aromatics >EC12-16	53374.2	5486.6	2.97	0.00	0.40	0.00	0.01	41.12	5.50	3.36	46.64
TPH Aromatics >EC16-21	40033.6	NR	44.12	0.00	5.88	0.00	0.00	0.00	0.00	50.00	0.00
TPH Aromatics >EC21-35	72037.9	NR	79.42	0.00	10.58	0.00	0.00	0.00	0.00	10.00	0.00

The results above show the following general trends:

- Exposure pathways for most heavy metals and organic-chlorine pesticides are dominated by direct soil ingestion;
- Exposure pathways for total petroleum hydrocarbons are typically dominated by inhalation pathways. Ingestion is the most significant exposure pathway for larger TPH species that exhibit lower volatilities. Non-soil exposure pathways (incorporated in the background and mean daily intake parameters) comprise a significant proportion of overall exposure;
- Notwithstanding the above, toxicity is generally significantly greater for inhalation exposure routes than for ingestion routes (reflected in lower HCV values for inhalation compared with HCVs for ingestion). This outweighs the effects of greater exposure via ingestion pathways for most contaminants. The result is that the lowest DQRA thresholds are predominantly for inhalation exposure;
- All DQRA thresholds are significantly higher than the Local MPCs employed in the ESIA regardless of exposure pathway;
- With the exception of mineral oils, all DQRA thresholds are significantly higher than the Dutch Intervention and Target Values and Canadian Environmental Quality Guidelines;
- Contamination levels, as identified through the ground investigation, in the following areas do **not** exceed the Site Specific DQRAs for any determinant:
    - Aral Sea and Surgil Field
    - Surgil Gas Field Drilling Sites
    - Surgil CGTU
    - UGCC (based on sampling undertaken in May 2011).
- It is not possible to directly compare banded TPH thresholds with mineral oil levels derived from the ground investigation. However indirect assessment is possible by comparison of the lowest DQRA thresholds for TPH bands with mineral oil levels. No mineral oil levels obtained in the 2011 ground investigation exceed the lowest TPH DQRA threshold (Aliphatic Hydrocarbons >EC8-10 = 138.6mg/kg).
- It should be noted that elevated levels of mineral oils potentially exceeding the banded TPH DQRA thresholds were encountered in the region of Karambetsky between 2004 and 2008. However, sample locations were not available for this ground investigation and therefore this data many not be representative of contamination levels on the UGCC site (Mott MacDonald, 2011)[i].

It is notable that organo-chlorine pesticides do not have inhalation Health Criteria Values. RIVM (2001)[xii] reports that data on the effects of inhalation exposure is “very limited” and “lacks essential information”. Exposure to DDT and breakdown products is therefore limited to ingestion of soil and dust. Similarly Zinc, Selenium, and large TPH compounds do not have inhalation HCVs due to a combination of low volatility, low toxicity or an absence of toxicological data.

Due to the wide range of physio-chemical properties and toxicity exhibited by TPH fractions, single thresholds for broad scale mineral oil / TPHs such as those used in the ESIA do not adequately represent risks from exposure. The Site Specific Default DQRA thresholds for small TPH fractions are lower than the Dutch Intervention Values and Canadian CCME mineral oil thresholds. However all TPH fraction thresholds are higher than the Uzbekistan MPCs.

The principal reasons why the DQRA thresholds are generally higher than the Dutch and Canadian Generic Assessment Criteria (GAC) are as follows:

- Contaminant toxicity is higher for humans of lower body weight. The DQRA thresholds assume adult receptors with higher body weights. The Dutch and Canadian GACs assume exposure to child receptors in residential scenarios.
- The GAC residential exposure modelling assumes exposure 365 days of the year. The DQRA assumes that site will be occupied by individuals for 169 days per year.

4.2 Sensitivity Analysis

Sensitivity Analysis has been performed on a range of input parameters to assess uncertainties associated with exposure across the range of exposure pathways identified in the site-specific default model for each contaminant. The following input parameters have been subject to sensitivity analysis:

- Soil Ingestion Rate
- Ground cover by hard surfaces or vegetation
- Soil Temperature
- Wind speed.

4.3 Soil Ingestion Rate

Soil ingestion is a significant component of exposure for the majority of non-volatile contaminants. The default model adult soil ingestion rate of 50mg/day is a USEPA approved value which has been adopted by the UK Environment Agency in the CLEA model. The USEPA (1997)[viii] note that this figure is "highly uncertain and based on a low level of confidence". This is largely due to a combination of inherently high variability in different situations and a lack of soil ingestion studies.

It is plausible that operations staff at the Surgil Gas Field could be exposed to high levels of dust and soil which could increase ingestion rates above the average levels used in the default site specific scenario. To understand the impact of ingestion exposure uncertainties, the model was re-run for ingestion rates 1 order of magnitude above and below the default value: (respectively 5mg/day and 500mg/day). The following DQRA thresholds have been derived:

Table 4.2: DQRA Thresholds for Soil Ingestion Rate Sensitivity Analysis

Determinant	Oral DQRA threshold (mg/kg)			Inhalation DQRA threshold (mg/kg) (from site specific default model)
Soil Ingestion Rate	5mg/day (Site specific default)	500mg/day	% Change relative to default	N/A
Arsenic	855.8	90.2	-89.46%	325.8
Cadmium	543.3	54.4	-89.98%	181.5
Mercury, elemental	NR	NR	-	26.8
Mercury, inorganic	6004.1	600.4	-90.00%	9773.4
Mercury, methyl	561.6	66.1	-88.24%	2596.6
Nickel	29817.1	3058.1	-89.74%	837.7
Selenium	17512	1780.4	-89.83%	NR
Zinc	800411	89514.8	-88.82%	NR
Copper	213496.8	23870.2	-88.82%	107113.4

Determinant	Oral DQRA threshold (mg/kg)			Inhalation DQRA threshold (mg/kg) (from site specific default model)
Chromium	8004.2	895.2	-88.82%	748.9
DDT	1330.2	148.8	-88.81%	NR
DDE	1292.1	144.5	-88.82%	NR
DDD	3922.1	438.6	-88.82%	NR
TPH Aliphatics >EC5-6	6673114.1	745938.3	-88.82%	319.3
TPH Aliphatics >EC6-8	6673114.1	745938.3	-88.82%	653.8
TPH Aliphatics >EC8-10	133340.5	14918.6	-88.81%	138.6
TPH Aliphatics >EC10-12	133340.5	14918.6	-88.81%	686.2
TPH Aliphatics >EC12-16	133340.5	14918.6	-88.81%	3057.9
TPH Aliphatics EC16-21	2668055.6	298416.0	-88.82%	NR
TPH Aromatics >EC8-10	53374.2	5967.6	-88.82%	214.0
TPH Aromatics >EC10-12	53374.2	5967.6	-88.82%	1117.6
TPH Aromatics >EC12-16	53374.2	5967.6	-88.82%	5486.6
TPH Aromatics >EC16-21	40033.6	4476.0	-88.82%	NR
TPH Aromatics >EC21-35	72037.9	8056.5	-88.82%	NR

The results show that increasing the soil ingestion rate to one order of magnitude above the CLEA default results in an 88.2 – 90% reduction in DQRA thresholds. Notwithstanding this substantial reduction in thresholds, the DQRA thresholds still exceed the Uzbekistan MPCs, Dutch Intervention Values and Canadian GACs. The results of the site specific DQRA sensitivity analysis for soil ingestion rate therefore suggest that the Generic Assessment Criteria used in the ESIA are likely to be protective of human health.

Excluding TPH, no soil contamination was found at project locations at levels exceeding the DQRA Thresholds derived using 500mg/day soil ingestion rate, including for organo-chlorine pesticides. The lowest TPH thresholds are for inhalation exposure which is unaffected by the ingestion sensitivity analysis. Consequently the conclusions of Site Specific Default modelling exercise presented in section 4.1 remain unchanged. As stated earlier, it is not possible to derive a single DQRA threshold for Mineral Oil for direct comparison with soil contamination data.

4.4 Ground Cover

The proportion of ground covered by hard surfaces or vegetation effects the ability of wind to raise dust of which the <10µm (PM_{10}) is considered respirable. The default CLEA model assumes that 80% of commercial sites are covered with hard materials or vegetation. The project sites are located in an arid climate with very little vegetation cover. It is furthermore assumed that the project sites will include large areas not subject to building cover. Precise levels of cover are subject to uncertainty. Consequently a site specific default value of 10% has been assumed to ensure model conservatism. The precise sensitivity to changes in cover have been modelled assuming a range of 0% cover to 20% cover. The results are summarised below:

Table 4.3: DQRA Thresholds for Ground Cover Sensitivity Analysis

	Oral DQRA Threshold (mg/kg)			Inhalation DQRA Threshold (mg/kg)		
Ground Cover by Hard Surfaces or Vegetation	0%	10% (Site specific default)	% Change relative to default	0%	10% (Site specific default)	% Change relative to default
Arsenic	855.8	855.8	0.00%	305.4	325.8	-6.26%
Cadmium	543.3	543.3	0.00%	170.1	181.5	-6.28%
Mercury, elemental	NR	NR	-	26.8	26.8	0.00%
Mercury, inorganic	6004.1	6004.1	0.00%	9161.2	9773.4	-6.26%
Mercury, methyl	561.6	561.6	0.00%	2584.6	2596.6	-0.46%
Nickel	29781.2	29817.1	+0.24%	785.2	837.7	-6.27%
Selenium	17490.7	17512.0	+0.24%	NR	NR	-
Zinc	800411.0	800411.0	0.00%	NR	NR	-
Copper	213496.8	213496.8	0.00%	96377.9	107113.4	-10.02%
Chromium	8004.2	8004.2	0.00%	674.0	748.9	-10.00%
DDT	1330.2	1330.2	0.00%	NR	NR	-
DDE	1292.1	1292.1	0.00%	NR	NR	-
DDD	3922.1	3922.1	0.00%	NR	NR	-
TPH Aliphatics >EC5-6	6673114.1	6673114.1	0.00%	319.3	319.3	0.00%
TPH Aliphatics >EC6-8	6673114.1	6673114.1	0.00%	653.8	653.8	0.00%
TPH Aliphatics >EC8-10	133340.5	133340.5	0.00%	138.6	138.6	0.00%
TPH Aliphatics >EC10-12	133340.5	133340.5	0.00%	686.2	686.2	0.00%
TPH Aliphatics >EC12-16	133340.5	133340.5	0.00%	3057.9	3057.9	0.00%
TPH Aliphatics EC16-21	2668055.6	2668055.6	0.00%	NR	NR	-
TPH Aromatics >EC8-10	53374.2	53374.2	0.00%	214.0	214.0	0.00%
TPH Aromatics >EC10-12	53374.2	53374.2	0.00%	1117.6	1117.6	0.00%
TPH Aromatics >EC12-16	53374.2	53374.2	0.00%	5486.4	5486.6	0.00%
TPH Aromatics >EC16-21	40033.6	40033.6	0.00%	NR	NR	-
TPH Aromatics >EC21-35	72037.9	72037.9	0.00%	NR	NR	-

The analysis shows that the inhalation thresholds are most sensitive to changes in ground cover. However, even with 0% cover (an unrealistically conservative scenario), the impact on thresholds is <10% compared with the site specific default thresholds and does not result in thresholds below the Uzbekistan MPCs and Dutch and Canadian GACs. The results of the site specific DQRA sensitivity analysis for hard and vegetative cover therefore suggest that the Generic Assessment Criteria used in the ESIA are likely to be protective of human health. With the exception of mineral oil (for which direct comparison is not possible), none of the DQRA thresholds assuming 0% ground cover were exceeded by recorded contamination levels at the project locations.

4.5 Soil Temperature

Weather data for the Aral Sea collected between 1961 and 2000 shows an average annual temperature range of 37.7ºC (-10.5 – 27.2 ºC) The area exhibits a highly variable annual temperature regime typical of an arid-continental climate. Soil Temperature is an input parameter for vapour diffusion model within CLEA. A site specific default temperature of 8.4 ºC has been used to derive default DQRA thresholds. In order to assess the impact of the high temperature variation on the thresholds, a sensitivity analysis have been undertaken assuming a maximum temperature of 27.6 ºC equivalent to the maximum 95%ile temperature in the 1961 – 2000 dataset. The sensitivity analysis has resulted in a <0.1% impact on the Default DQRA Thresholds for inhalation and ingestion exposure.

4.6 Wind Speed

Wind speed is used in the CLEA model to determine vapour and dust diffusion. Wind speed data has been obtained for the Aral Sea for the period 1961 – 2000. The data summarised below suggests only moderate variability in wind speeds, despite the largely open, flat and unobstructed landscape of the project locations:

- Mean wind speed (Used in Site Specific Default Model): 4.81m/sec
- Lower 5%ile wind speed: 3.8m/sec
- Upper 95%ile wind speed: 5.8m/sec.

The default DQRA thresholds have been compared with thresholds derived for the upper 95%ile wind speed in the table below:

Table 4.4: DQRA Thresholds for Wind Speed Sensitivity Analysis

	Oral DQRA Threshold (mg/kg)			Inhalation DQRA Threshold (mg/kg)		
Wind speed	4.81m/sec (Site Specific Default)	5.8m/sec	% Change relative to default	4.81m/sec (Site Specific Default)	5.8m/sec	% Change relative to default
Arsenic	855.8	855.8	0.00%	325.8	224.2	-31.18%
Cadmium	543.3	543.3	0.00%	181.5	124.9	-31.18%
Mercury, elemental	NR	NR	-	26.8	26.7	-0.37%
Mercury, inorganic	6004.1	6004.1	0.00%	9773.4	6726.4	-31.18%
Mercury, methyl	561.6	561.6	0.00%	2596.6	2517.6	-3.04%
Nickel	29817.1	29575.3	0.81%	837.7	576.6	-31.17%
Selenium	17512.0	17368.6	0.82%	NR	NR	-
Zinc	800411.0	800411.0	0.00%	NR	NR	-
Copper	213496.8	213496.8	0.00%	107113.4	61079.7	-42.98%
Chromium	8004.2	8004.2	0.00%	748.9	427.1	-42.97%
DDT	1330.2	1330.2	0.00%	NR	NR	-
DDE	1292.1	1292.1	0.00%	NR	NR	-
DDD	3922.1	3922.1	0.00%	NR	NR	-
TPH Aliphatics >EC5-6	6673114.1	6673114.1	0.00%	319.3	319.3	0.00%
TPH Aliphatics >EC6-8	6673114.1	6673114.1	0.00%	653.8	653.8	0.00%
TPH Aliphatics >EC8-10	133340.5	133340.5	0.00%	138.6	138.6	0.00%
TPH Aliphatics >EC10-	133340.5	133340.5	0.00%	686.2	686.2	0.00%

	Oral DQRA Threshold (mg/kg)			Inhalation DQRA Threshold (mg/kg)		
12						
TPH Aliphatics >EC12-16	133340.5	133340.5	0.00%	3057.9	3057.9	0.00%
TPH Aliphatics EC16-21	2668055.6	2668055.6	0.00%	NR	NR	
TPH Aromatics >EC8-10	53374.2	53374.2	0.00%	214.0	214.0	0.00%
TPH Aromatics >EC10-12	53374.2	53374.2	0.00%	1117.6	1117.6	0.00%
TPH Aromatics >EC12-16	53374.2	53374.2	0.00%	5486.6	5485.5	-0.02%
TPH Aromatics >EC16-21	40033.6	40033.6	0.00%	NR	NR	-
TPH Aromatics >EC21-35	72037.9	72037.9	0.00%	NR	NR	-

Despite the low variability of wind speed at the project location, the sensitivity analysis has revealed a significant impact on inhalation exposure thresholds principally for heavy metals. This is likely to be due to the low health criteria values for dust inhalation for these determinants. The impact on vapour diffusion appears to be non-significant at the wind speed ranges used in the analysis as shown by the negligible impact on DQRA thresholds for volatile and semi-volatile TPH species.

Assuming the upper 95%ile wind speed across the project area, the DQRA thresholds for inhalation and oral exposure are still significantly higher than the National MPC, and the Dutch and Canadian GACs used in the ESIA (with the exception of TPHs which remain unaltered by wind speed). The results of the site specific DQRA sensitivity analysis for wind speed therefore suggest that the Generic Assessment Criteria used in the ESIA are likely to be protective of human health.

With the exception of TPHs (for which direct comparison is not possible), none of the DQRA thresholds derived assuming the upper 95%ile wind speed are exceeded by soil concentrations measured on site.

5. Conclusions

This paper presents the findings of a Detailed Quantitative Risk Assessment (DQRA) for the Surgil Gas Field. This exercise uses site specific contamination exposure parameters in an attempt to model contamination risks for the proposed development sites. The purpose of the study has been to validate the findings of a risk assessment using nationally recognised contamination risk assessment thresholds, and internationally recognised generic quantitative risk assessment thresholds in line with national and international guidance. The principal findings of the DQRA are presented below:

- The DQRA thresholds using default site specific exposure parameters has provided thresholds that exceed the Uzbekistan MPCs for all measured parameters;
- The DQRA thresholds using default site specific exposure parameters has provided thresholds that exceed the Dutch and Canadian Generic Assessment Criteria for all measured parameters, with the exception of small chain aliphatic and all aromatic total petroleum hydrocarbons;
- Use of the DQRA thresholds would not significantly alter the interpretation of risks presented in the ESIA for the following contaminants for any of the project areas subject to ground investigation:
    - Arsenic
    - Cadmium
    - Mercury
    - Nickel
    - Selenium
    - Zinc
    - Copper
    - Chromium

The DQRA risk assessment confirms that the National MPCs, Dutch and Canadian GACs used in the ESIA are likely to be protective of human health risks for the above determinants.

- The DQRA ingestion thresholds derived for DDT, DDE, and DDD using default site specific exposure parameters are significantly higher than the national MPCs, and the Dutch and Canadian GACs used in the ESIA assessment. Furthermore, with reference to the ground investigation results, levels of these organo-chlorine pesticides recorded in the project area do not exceed the DQRA ingestion thresholds. The DQRA sensitivity analysis confirms such conclusions are still valid for organo-chlorine pesticides even when accounting for conservative site specific exposure scenarios.
- Direct comparison of DQRA thresholds for banded TPHs against the mineral oil data obtained from the ground investigation is not possible. However an estimate of potential risk may be obtained by comparison of the lowest DQRA threshold for individual TPH bands against the mineral oil levels obtained from the 2011 ground investigations. No mineral oil samples exceeded the lowest TPH band threshold in any project location. Exceedances of TPH thresholds were encountered in earlier investigations in Karambetsky between 2004 and 2008, but sample locations from this investigation are uncertain and may not relate to precise project development locations.
- While it is preferable to use speciated total petroleum hydrocarbon data for risk assessment, it was not possible to obtain such data during the site investigation. Nonetheless, the current assessment suggests that the use of the DQRA thresholds would not significantly alter the ESIA interpretation of risks from TPHs at Surgil CGTU, Well Locations and the Aral Sea and Surgil Gas Fields.
- Use of the DQRA thresholds would not significantly alter the ESIA interpretation of risks against the National MPCs for TPHs. The DQRA assessment confirms that the MPCs are protective of human health risks for TPH bands within the range C5-35. Risks from TPH cannot be progressed any further without the receipt of banded TPH data.
- With the exception of TPHs, no exceedances of the DQRA thresholds have been observed in the ground investigation samples for the tested determinants..

- It is recommended that the DQRA thresholds presented in Table 3 are used for the purposes of further risk assessment in further revisions of the ESIA as necessary.
- The DQRA sensitivity analysis confirms that the above conclusions are valid even accounting for the following conservative exposure scenarios:
    - Increased inhalation exposure resulting from the use of the upper 95%ile wind speed based on a long term site specific dataset[ix]
    - Increased inhalation resulting from the assumption of 0% hard or vegetative ground cover allowing increased volumes of dust to be mobilised (compared to the default scenario)
    - Increased contaminant volatilisation resulting from the use of the upper 95%ile temperature for the site[ix]
    - Increased soil ingestion resulting from the use of an ingestion rate one order of magnitude above the USEPA[viii] and Environment Agency[vi] adopted rate of 50mg per day.
- Based on the results of the DQRA there would be no requirement to initiate remedial measures (including specialist PPE) to address risks to human health from the tested soil contaminants. However, taking into account current limitations in modelling DQRA inhalation thresholds for organo-pesticides in addition to the fact that physical exposure to soil and dust can still result in unacceptable risks to site operative it is recommended good site practice and appropriate use of PPE in line with the IFC EHS General Guidelines is maintained in particular during construction works. Specifically as a precautionary measure, it is recommended that facemasks with the appropriate filters for dust removal and air purification (vapours, including potential pesticide vapours) are worn by all construction workers. Workers should be trained on PPE requirements and PPE should be maintained and replaced when worn out. Such requirements should be reviewed on a regular basis through appropriate job safety / hazard analysis.

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[iii] CCME (2011): "*Canadian Environmental Quality Guidelines, Summary table*", Canadian Council of Ministers of the Environment
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[vi] Environment Agency (2008): "*Updated technical background to the CLEA Model*", Science Report SC050021/SR3
[vii] Environment Agency (2008): "*Human health toxicological assessment of contaminants in soil*", Science Report SC050021/SR2
[viii] USEPA (1997): "*Exposure Factors Handbook*", United States Environmental Protection Agency
[ix] CAREWIB (website extract, 2011): http://www.cawater-info.net/aral/data/index_e.htm Central Asia Regional Water Information Base Project
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[xi] LQM and CIEH (2007): "*Generic Assessment Criteria for Human Health Risk Assessment*", Land Quality Management and the Chartered Institute of Environmental Health
permissible risk levels", RIVM report 711701 025
[xiii] Environment Agency (2008): "*Compilation of data for priority organic pollutants for derivation of Soil Guideline Values*", Science report SC050021/SR7