

Sefti bilong Dem na Haidropawa Projek

Haidro pawa dem inap long kamapim mak bilong pawa inap long pawarim main na ol kominti tu i ken yusim long plenti yia.



Wanpela ples arere long Wara Frieda

SAMTING YU MAS SAVE

- Namba wan wok bilong dispela dem, em long kalabusim ol ston na pipia bilong main na wankain taim, kamapim pawa saplai igo long main na lokol kominiti.
- Dispela dem em ol save man bilong wokim dem long wol wantaim ol enjinia igo pas long disainim. Igat tu ol arapela namel man huset igat wankain save na ol i glasim na givim tingting bilong ol long disain bilong dispela dem.
- Dispela dem ol save man i disainim bihainim namba wan prektis bilong wol stendet. Em ikain dem we inap operet long ples we isave kisim moa ren na guria.

WANEM ASTINGTING BILONG PUTIM DISPELA DEM?

Wok bilong dispela haidropawa dem en long:

- Kamapim klinpela pawa na saplaim igo long main na ol lokol kominiti; na
- Kalabusim gut ol pipia bilong main olsem bai ol pipia ino ken bagarapim ples graun na wara.

Ples we main ilaik kamap, em istap moa long 200kilomita longwei long nambis na bai ikisim bikpela pawa tru long pampim ol teling long main eria igo long nambis. Ino gat kain pawa istap long mekim dispela ikamap. Olsem na tingting bilong putim teling o pipia igo daun long solwara, dispela ino inap kamap. Antap moa yet em olsem, main bai ino inap tromoi ol pipia bilong em nambaut long bus o wara. FRL na Gavaman bilong PNG itambu long mekim na tu ol lokol kominiti ino inap laikim.

Olsem na wanpela rot tasol bilong kirapim main na wankain taim banisim ol pipia en long wokim haidro pawa dem. Dispela haidro pawa dem inap long kalabusim pipia na long wankain taim, kamapim pawa bilong main na kominiti.

EM WANEM KAIN DEM STRET?

Sefti na strong bilong dem istap namba wan long tingting taim ol saveman bilong dem i disainim. Dispela haidro pawa dem projek ino wankain olsem telings dem we ol i bin wokim long Panguna main or long Ok Tedi na na graun ibruk. Nogat. Dispela dem long Frieda River Projek em i narapela kain. Disain bilong en iolsem disain bilong haidro pawa dem we| sefti stendet na strong bilong en iantap moa winim telings dem.

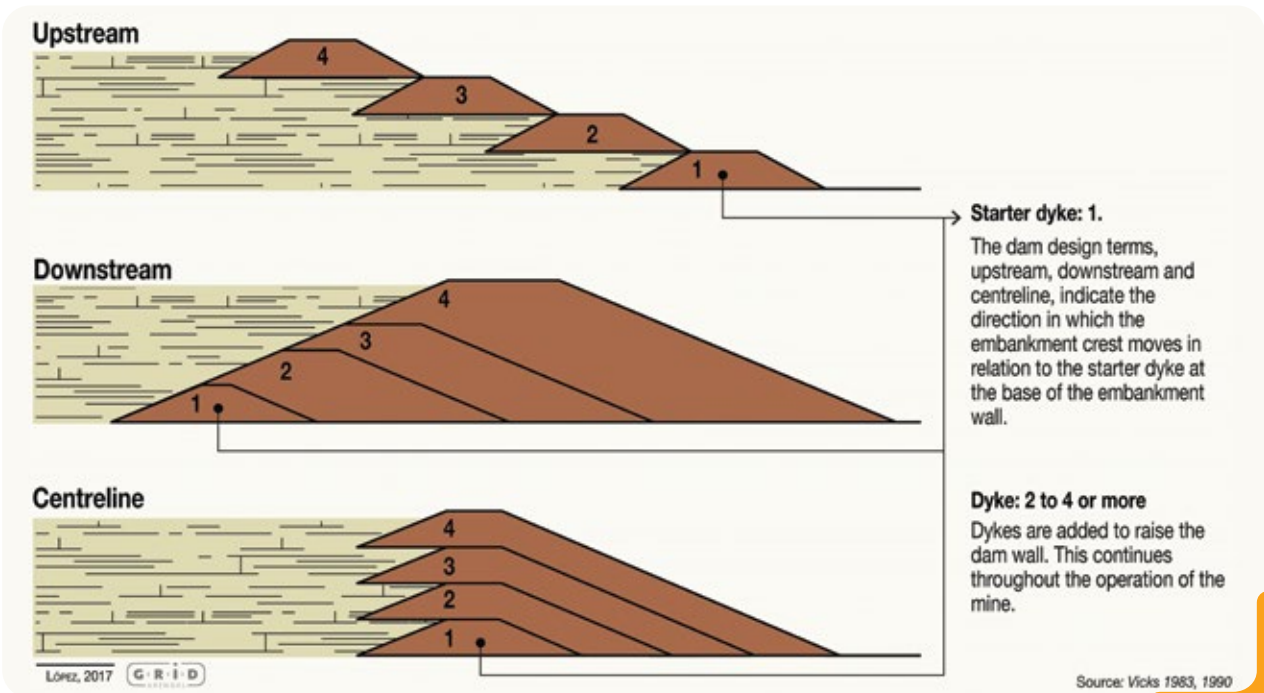
Igutpela moa sapos yu klia long deferens namel long telings dem na haidro pawa dem so yu ken save olsem haidro pawa dem igat moa strong na ol i wokim gut. Igat tripela kain telings dem. Piksa tamblo isoim ol dispela kain we ol isave wokim igo antap, wokim igo daun na wokim long namel.

TELINGS DEM

Long skelim ol tripela kain telings dem, dispela we ol iwokim igo antap (Upstream) em ino strong tumas na iken bruk kwik. As bilong dispela i olsem banis bilong dem ol imekim long telings bilong main. Em ikain dem we ol imekim long kantri Brazil na i bin bruk na gavman bilong Brazil iputum tambu long dispela kain telings dem.¹

Kain telings dem we ol i save mekim igo daun² (Downstream) em imoa strong na papa kampani bilong FRL, PanAust Limited imekim na operetim long main bilong em long kantri Laos.

Long yia 2020 igat wanpela wok painim aut ikamap long kain telings dem we ol maining kampani imekim. Dispela wok painim aut em ol bikpela grup olsem International Council on Mining and Metals, United Nations Environment Program na United Nations program bilong mekim stretpela investmen igo pas long dispela wok painim aut o riviu. Ol ikolim olsem, 'Global Telings Riviu Stadi'. Dispela stadi i painim aut olsem ino gat gutpela lukaut long ol teling dem, na taim ol isurukim dem na mekim dem antap long dem, banis aninit isave lusim strong bilong en, olsem na isi long en i bruk³. Dispela em stori bilong telings dem. Haidro pawa dem ino wankain.



Piksa bilong ol tripela kain telings dem ⁴

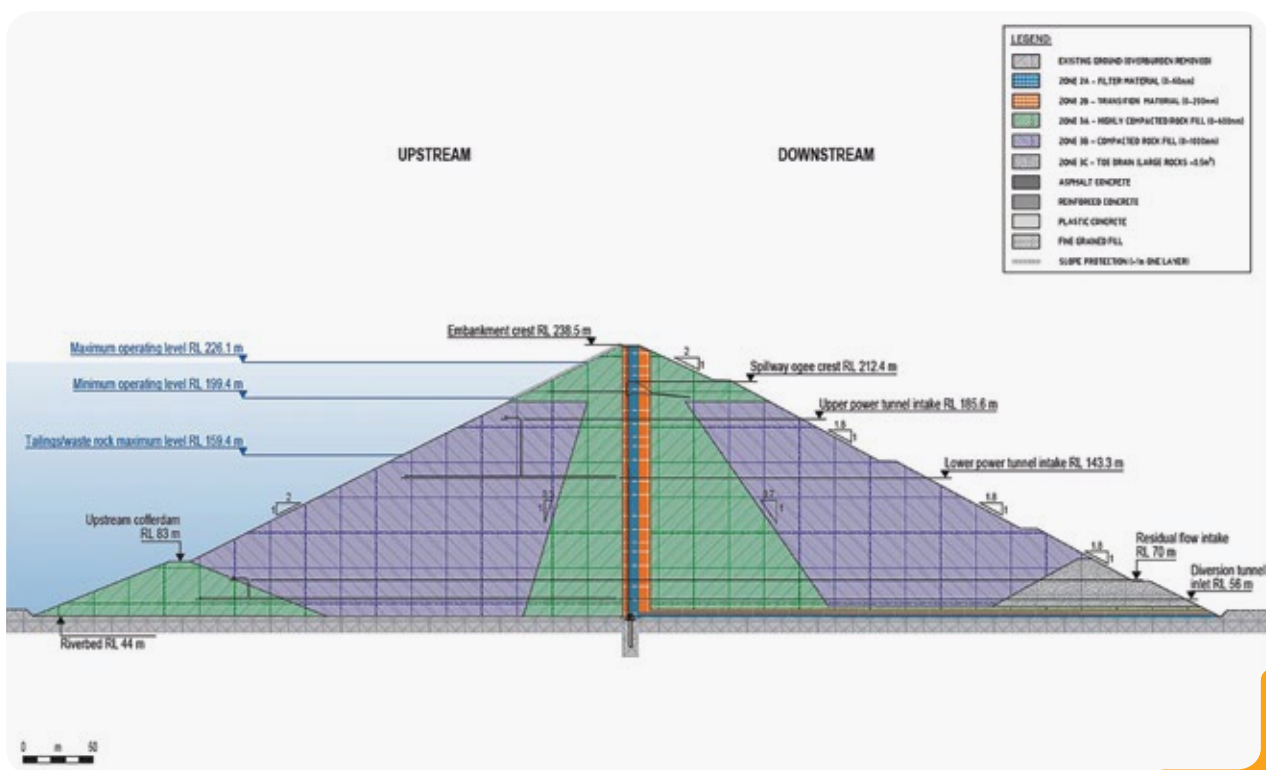
HAIRO PAWA DEM PROJEK

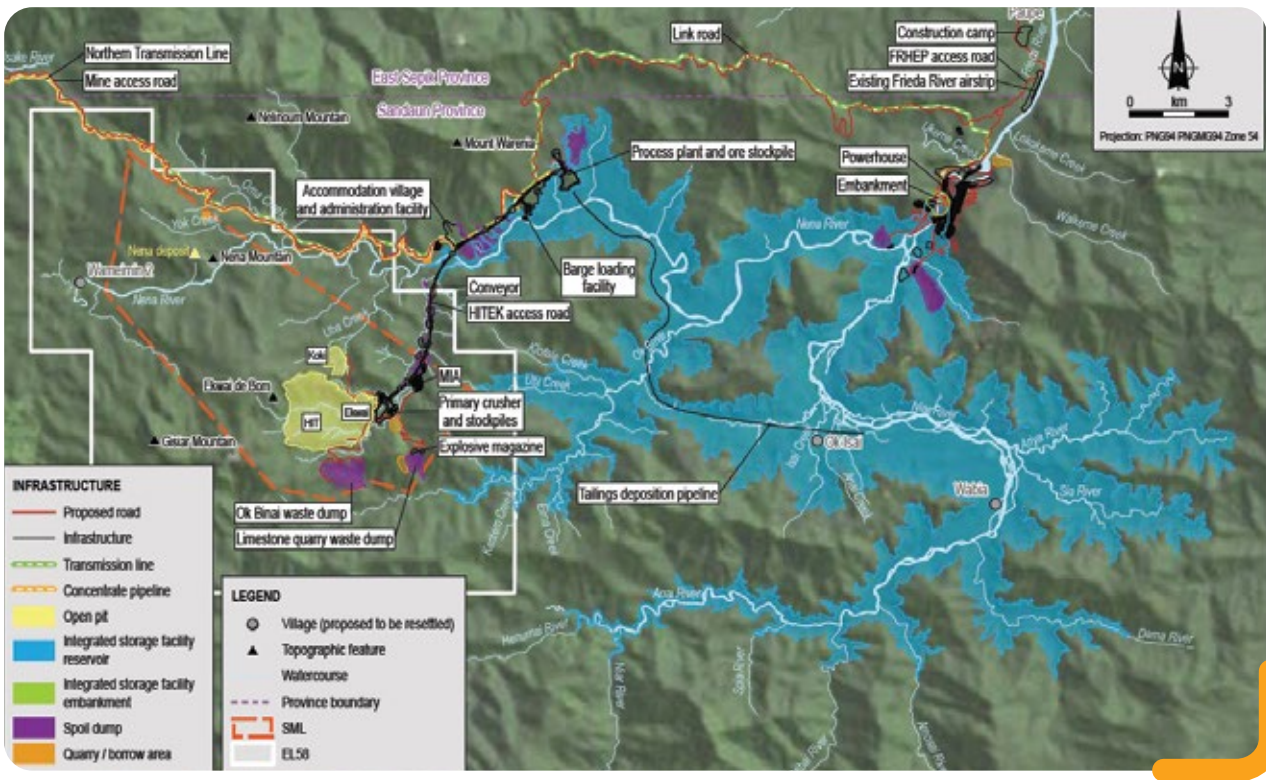
FRL i tingim sefti na strong bilong dem olsem na em igo het long disainim kain dem we standat bilong em i antap na ino wankain olsem ol teling dem. Yu mas klia olsem:

- Ol saveman i disainim olsem haidro pawa dem, olsem we strong bilong en i winim ol kain dem we ol isave putim teling bilong main.
- Banis long sait sait bilong haidro dem, em ol bai mekim long taim konstraksen bilong dem ikamap. Dispela kain wei, em ino wankain olsem konstraksen bilong teling dem.
- Namel bilong dem bai igat gumi o long tok Inglis 'asphalt core' we iken sanap strong na muv sapos igat guria. Ol nomol teling dem ino gat dispela.

Piksa tamblo isoim kain dem.

Moni mak bilong wokim kain haidro pawa dem iantap moa winim moni mak bilong nomol teling dem. Frieda River Projek iluksave long lukautim komuniti, wara na graun, olsem na em ino kandem bikpela moni mak bilong mekim haidro pawa dem.





DEM BAI SANAP WE?

Dispela haidro pawa dem, bai isanap long Wara Frieda na longwei olsem 70 kilomita long maus bilong Wara Frieda bungim Wara Sipik. Bris antap long dem i longpela olsem 747 mita na banis bilong dem, longpela bilong em iolsem 191mita. Sais bilong wara we dem inap long holim i olsem 9.6 kubik bilion wara. Dispela dem i bikpela tru winim ol arapela haidro pawa dem long PNG.

DEM BAI WOK OLSEM WANEM?

Dem bai kalabusim telings na pipia ston bilong main

Igat sampla kain marasin istap insait long ol pipia ston na telings bilong main we inap long kamapim esid nogut na bagarapim bus, graun na wara.

FRL bai putim ol dispela pipia ston na teling bilong main igo insait long raun wara bilong haidro pawa dem.

Dispela em iwanpela rot tasol bilong banisim hevi nogut ikamap long bus, graun, wara na laip bilong ol pipol. Dip bilong hap we ol pipia bai slip aninit long wara em 40 mita. Ol pipia imas stap long kain dip wara olsem, bai ino inap long pas wantaim win na kamapim esid nogut. Esid nogut isave kamap taim ol pipia ston na telings ipas wantem win. Long stopim dispela, FRL bai putim ol dispela pipia ston na teling aninit long raun wara bilong dem.

Putim ol kain pipia ston na telings bilong main aninit long raun wara bilong dem olsem kain, em i namba wan wei bilong banisim na stopim bagarap o polusen long noken kamap. Yu ken ritim na kisim moa save sapos yu bihainim dispela [link](#).

KAMAPIM KLINPELA PAWA

Wara i ron antap long dem bai igo insait long wanpela pawa haus. Dispela pawa haus bai igat 10pela masin i raunraun olsem wil. Tok English oli kolim 'Turbine'. Masin i raunraun olsem wil, wok bilong en long tanim tanim na givim pawa. Dispela pawa bai saplai igo long main na tu long kominiti.



Banis bilong haidro pawa dem na pawa haus

Dispela haidro pawa projek inap kamapim 490 megawat bilong pawa. Frieda River Kopa Gol Projek bai yusim sampela bilong dispela pawa, na kominiti, bisnis na ol arapela tu iken yusim. Em bai kisim 5pela yia long wokim kama dispela haidro pawa dem na taim ipinis, dem inap operet moa long 100 yia. Taim kopa na gol ipinis na main ipas, dispela haidro pawa bai operet yet.

Husait i disainim dem?

Wok stadi bilong disainim dem em wanpela biknem kampani igat save bilong enjina ol ikolim SRK na Stantec igo pas long mekim.

Dispela dem ol enjina imekim stadi na i disainim olsem strong bilong en inap long sanap long hap i save gat bikpela gurua, ren na wara tait. Disain bilong dem ibihainim stendet bilong Australia. Ol ikolim Australian National Committee on Large Dam (ANCOLD). Wankain tu, disain ibihainim stendet bilong International Commission on Large Dam (ICOLD) we iken sanap strong maski bikpela gurua ikamap. Sapos graun i gurua o bikpela wara tait ikamap, dem inap muv na sanap gut gen na ino inap bruk.

FRL ikisim ol enjina bilong kainkain kampani long mekim stadi na disainim dispela dem. PNG gavaman long bihainim proses bilong en yet, ikisim ol save man bilong SMEC long mekim rivi. SMEC em wanpela enjina kampani stap long Australia na igat bikpela save bilong wok bilong haidro dem.

Plenti ol saveman i mekim stadi long disain bilong dispela dem. Sampela imekim rivi antap ken long stadi na disain istap pinis. Ripot itok olsem, em iorait long mekim dispela kain dem bihainim ol gaitlain na stendet we istori pinis. Sapos ol i wokim kain haidro dem bihainim stret intenesinol stendet bai dem isanap strong maski igat bikpela graun igurua, ren na wara i tait.

Ol ki eria long disain bilong dem

Dem em ol enjina i disainim bihainim stendet bilong Australia National Committee on Large Dam (ANCOLD) we iluksave long gurua na wara tait isave kamap long ples we dem bai sanap.

Arapela ki samting long disain bilong dem, em olsem, dem igat strongpela banis long sait sait, na igat hap we taim wara ipulap, ol dispela wara iken kapsait. Tok Inglis, ol ikolim 'spillway'. Em hia ol ki samting we inap long mekim dem isanap strong long taim:

- Igat bikpela ren na ren ipundaun longpela taim mekim raun wara insait long dem i solap. Tok Inglis ol ikolim 'Probable Maximum Precipitation' (PMP).
- Sapos ren ipundaun moa yet na wara itait, Tok Inglis ol ikolim 'Probable Maximum Flood' (PMF)—dem inap sanap strong yet.
- Stadi itok olsem long 4pela taim insait long 100 yia, isave gat bikpela ren tru na wara itait. Dispela dem ol idisainim long en iken sanap strong long 100 yia na moa maski bikpela ren ipundaun na wara isolap.
- Strong bilong dem inap long mak bilong bikpela gurua. Tok Inglis ol ikolim 'Maximum Credible Earthquake' (MCE)

Ol jioteknikol enjina i digim olsem 70pela hol long graun na kisim ol sempol long mekim stadi na wok painim aut long luksave gut long hap we gurua isave kamap. Antap long dispela stadi, ol enjina i disainim dispela haidro pawa dem we oli putim disain bilong banis long sait sait, hap bilong wara long kapsait igo arasait sapos dam ipulap, pawa haus na ol arapela samting bilong sapotim dem.

Ol tingting istap long banisim birua ino ken kamap

FRL i luksave olsem sapos igat hevi long dem, bai igat bagarap ikamap long laip na sindaun bilong ol kominiti tamblo igo olsem long Wara Sipik. Tasol imas igat luksave olsem igat wankain ol haidro pawa dem we oli wokim long arapela kantri tu we dem istap long hetwara na ol ples na taun istap tamblo long wara. Ol dispela haidro dem istap strong na ino bruk bikos ol saveman iwokim bihainim intenesinol stendet. Ol ibihainim dispela standet long wokim haidro dem na lukautim dem olsem na haidro dem ino bruk. Em wankain bai FRL imekim long Frieda.

Dispela haidro pawa dem em ol saveman i disainim bihainim intenesinol stendet we inap long abrusim birua bilong bruk na inap operet moa long 100 yia. Plenti ol saveman bilong mekim dem, independent enjina na arapela ol tu itok olsem disain bilong dem iorait long wokim.

Antap long dispela, ol dispela saveman itok klia olsem:

- FRL imas mekim moa stadi igo insait long painim aut strong bilong graun na ston long hap we dem bai sanap. Na tu imas gat stadi bilong guria long dispela hap na ripot bilong ol dispela stadi imas stap insait long laspela disain bilong dem;
- Imas igat namel man o independen saveman long mekim rivi long laspela disain bilong dem taim ol wokstadi ipinis;
- Bung na toktok wantaim ol pipol na kominiti long ol ples tamblo long wara we bagarap inap painim ol sapos igat hevi long dem;
- Sekim imas kamap olgeta taim long banis antap na long sait sait bilong dem na ol arapela hap bihainim intenesonel standet;
- Seifti inspeksen bilong dem;
- Imas igat sistem bilong toksave long ol kominiti tamblo long wara sapos igat hevi ikamap long dem;
- Plen bilong rausim ol kominiti tamblo long wara igo long gutpela hap sapos hevi ikamap long dem; na
- Ol sapot plen bilong givim sevis igo long ol dispela kominiti sapos ol ibungim hevi bilong dem.

Bai igat moa stadi long disain bilong dem

Dispela disain na plen bilong haidro pawa dem we istap nau wantem Gavman bilong PNG, dispela em ino laspela disain, nogat. Igat moa wok istap long mekim long sait bilong enjinia stadi long hau dem bai sanap na stap strong. Dispela enjia stadi ino kamap yet na em bai kamap taim FRL ikisim pemit long gavman long go het na kirapim projek. Bai igat moa wok painim aut we ol jioteknikal enjina na ol arapela saveman igo pas long mekim. Bihainim wok bilong ol, bai igat arapela proses we gavman imas skelim na givim tok orait gen.

FRL bai ino inap long go het na wokim dem nating sapos ino gat plen na disain, na em ino kisim tok orait ikam long gavaman bilong PNG.

Wanem samting bai kamap taim main ipas?

Laip bilong main bai igo abrusim 33 pela yia. Na taim main ipas, haidro pawa dem bai operet yet na saplaim pawa long kominiti long moa long 100 yia. Dem bai stap long holim wara na wokim pawa na tu long kalabusim pipia bilong main ino ken kam aut.

Long taim main ilaik pas, bai igat agrimen wantem gavaman bilong Papua Niu Gini long luksave long huset bai igo pas long lukautim haidro pawa na dem. Moa toktok bilong dispela bai kam aut long bihain taim. Tasol astingting insait long dispela agrimen bai lukluk long:

- Lukautim banis long sait sait na antap bilong dem. Imas igat inspeksen progrem long ol dispela eria bilong dem bihainim standet bilong ANCOLD na ICOLD.
- Mentenens na wok lukaut: bai igat wok bilong sekim dem klostu klostu na mekim mentenens long banis bilong dem na hap we wara isave kapsait.
- Plen bilong pasim haidro pawa olgeta.
- Plen bilong putim moni ikamap long haidro pawa igo long wanpela tras fan o long wanpela akaunt. Rot bilong yusim dispela moni em long spendim long was long sefti bilong dem taim em ioperet inap ipas.

Dispela haidro pawa dem disain em ikisim plenti saveman long glasim na mekim gut olsem bai ino gat hevi ikamap long bus, graun na wara long plenti yia bihain.

¹ See "Brazil to decommission all upstream tilings dams by 2021: Australian Mining, 19 February 2019:

<https://www.australianmining.com.au/news/brazil-to-decommission-all-upstream-tailings-dams-by-2021>

² See Chapter VII, "Lessons from Tailings Facility Data Disclosures", in "Towards Zero Harm: A compendium of papers prepared for the Global Tailings Review": <https://globaltailingsreview.org/compendium>

³ See Chapter II, "Mine Tailings Facilities: Overview and industry Trends", in "Towards Zero Harm: A compendium of papers prepared for the Global Tailings Review": <https://globaltailingsreview.org/compendium>

⁴ Piksa antap FRL ikisim long dispela websait: <http://www.grida.no/resources/11422>