Meeting Minutes for
Working Group Session
on
Interruptible Load Remedial Action Scheme (ILRAS)

When: 2:00 – 4:30 pm, April 17, 2008
Location: AESO Boardroom – 25th Floor

Attendees:

Stakeholders:

Rick Cowburn (UCA)	Rod Crockford (EnCana)	Kim Johnston (ATCO Power)
Evan Bahry (IPPSA)	Chris Best (TransCanada)	Stan Miller (ATCO Electric)
Darren Gogol (TransAlta)	Horst Klinkenborg (ATCO Power)	Norman Mills (BP Canada)
Lynn Meyer (EPCOR)	Damian Opel (Direct Energy)	Grant Pellegrin (Valeo Power / ADC)
Miles Stroh (FortisAlberta)	Randy Stubbings (ENMAX)	Cheryl Terry (IPCAA)

AESO:

Paul Barry,	Heidi Kirrmaier	Cliff Monar
Owen Craig	Laura Letourneau	Jerry Mossing
Doyle Sullivan		

Conclusions and Action Items:

1. AESO presented the results of the under-frequency study including a conclusion that ILRAS and LSS services could be combined into a single service called Load Shed Requirements (LSR). Both LSR and a fast ramp service are required to increase the AB/BC tie line capacity. There was general agreement that replacing ILRAS and LSS with a new service called LSR is acceptable.
2. There was general agreement that a competitive process should be utilized initially to attempt to procure the requirements for LSR and a fast ramp service. The EOI will have three separate requirements: (i) LSR for in-market imports; (ii) LSR for supply shortfall and (iii) Fast Ramp. Each separate requirement will include an estimate of activation of the services based on historical information.
   - ⇒ For Supply Shortfall, if the EOI shows sufficient interest (i.e. is contestable), an RFP will be issued and offers solicited. If there is insufficient interest, a stakeholder session will be convened to discuss next steps.
   - ⇒ For In-Market Imports, if the EOI show sufficient interest (contestable), the working group will be re-convened to address additional concerns raised by stakeholders at the session prior to issuing an RFP, namely:
     - Who pays for it?
       a. Load; as is currently done with all transmission costs (be it transmission lines or ancillary services), or
       b. Importers; with concerns raised by stakeholders that included whether having importers pay is contrary to the EUA, and that charging importers an additional fee may create an unfair advantage to intra-Alberta generators (contrary to the requirement of EUA 17(a) and (c))
     - Whether procuring these services is contrary to FEOC?
     - If there is insufficient interest in the EOI, a stakeholder session will be convened to discuss next steps.
   - ⇒ The EOI will be issued in May, 2008.

3. No discussion occurred on what would be the next steps if insufficient services were procured - this will be deferred to the next stakeholder session, if required.
4. Next working session likely to occur in June, after results of the EOI are in.

ILRAS Study History

- February 1998 – ILRAS implemented – Gridco recommendation
- December 1998 – ILRAS requirements established based on level of import and AIES load
- 2001 – AB-BC Interchange ‘check case’ study – confirm ILRAS arming levels
- 2004 – AB-BC Interchange Study and Review – Genesee 3 interconnection and confirm ILRAS arming levels
- 2006 – AB-BC Interchange studies – primary focus on export
- 2007/8 – under frequency study – system performance following tie trip and review of mitigation options

Under Frequency Services

- The purpose of under frequency services is to prevent loss of firm load for single contingencies
  - **ILRAS** – instantaneous load trip when tie-line trips during import conditions
  - **LSS** – instantaneous load trip when system frequency hits 59.5 Hz
  - **BFR** (Brazeau Fast Ramp) – delayed action to assist Alberta's system frequency recovery
- UFLS – a WECC wide safety net to avoid blackouts or widespread outages as a result of large loss of generation

AB – BC Tie Line Trip Study Scope

- Evaluate the AIES performance following tie-line trips during import
  - Validate system dynamic model
  - Review ILRAS and LSS services and requirements
  - Evaluate use of local U/F relays rather than ILRAS via high speed telecommunication
- Study focused on the Alberta system frequency performance following the tie-line trip during the first 15 seconds into the event

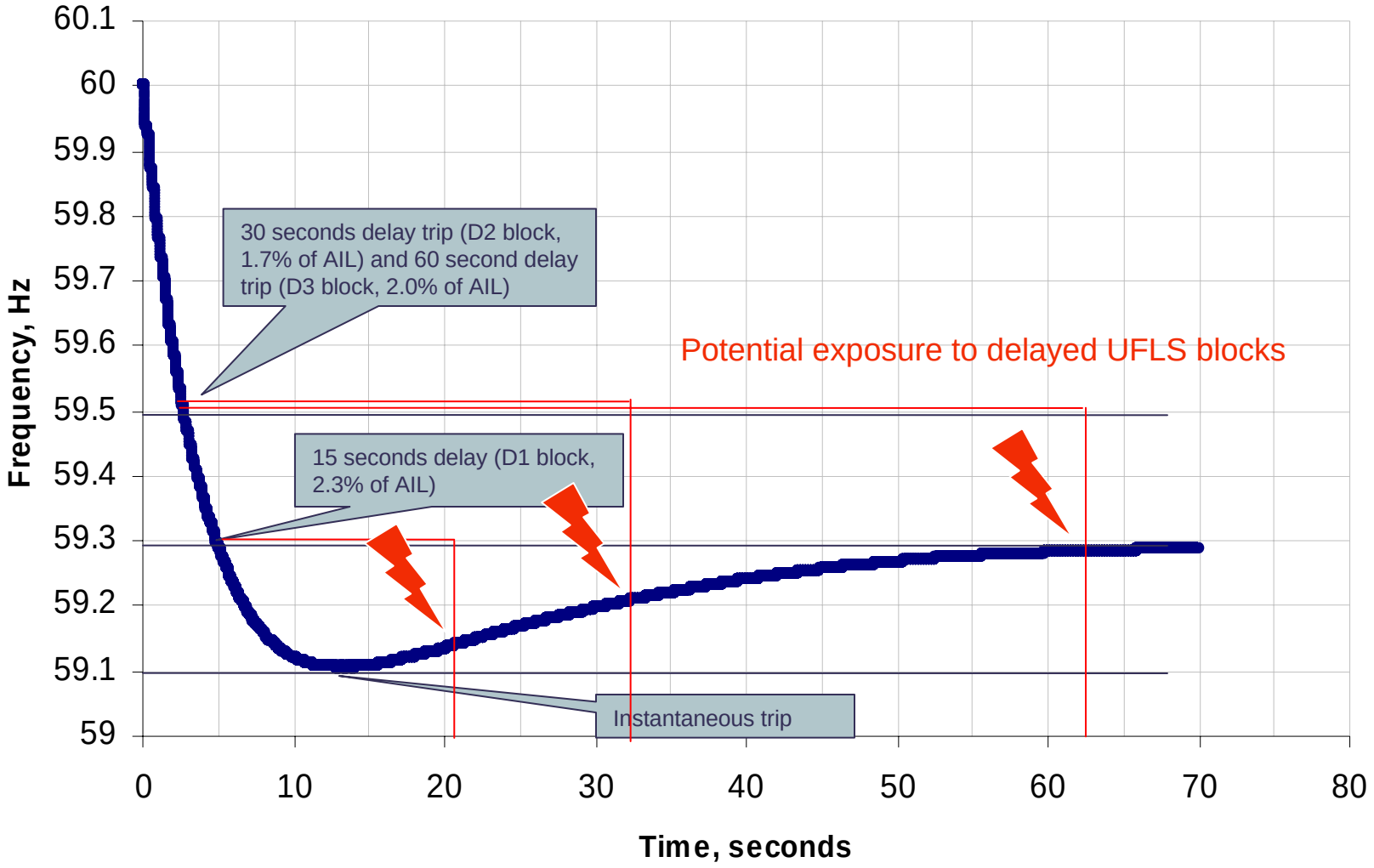
Study Assumptions

- Current AIES dynamic model – system inertia, turbines and generators, large motors, natural load response to frequency change, governors, AVR, PSS, SVC
- Varied generation dispatch (mix of coal, hydro, gas)
- Spinning Reserve units provided by a mix of gas and hydro units
- Maximum requirement of u/f mitigation service was derived by the frequency response in a worst case scenario
  - Minimum governor action
  - Low system inertia
- The impact of wind based generation is not considered

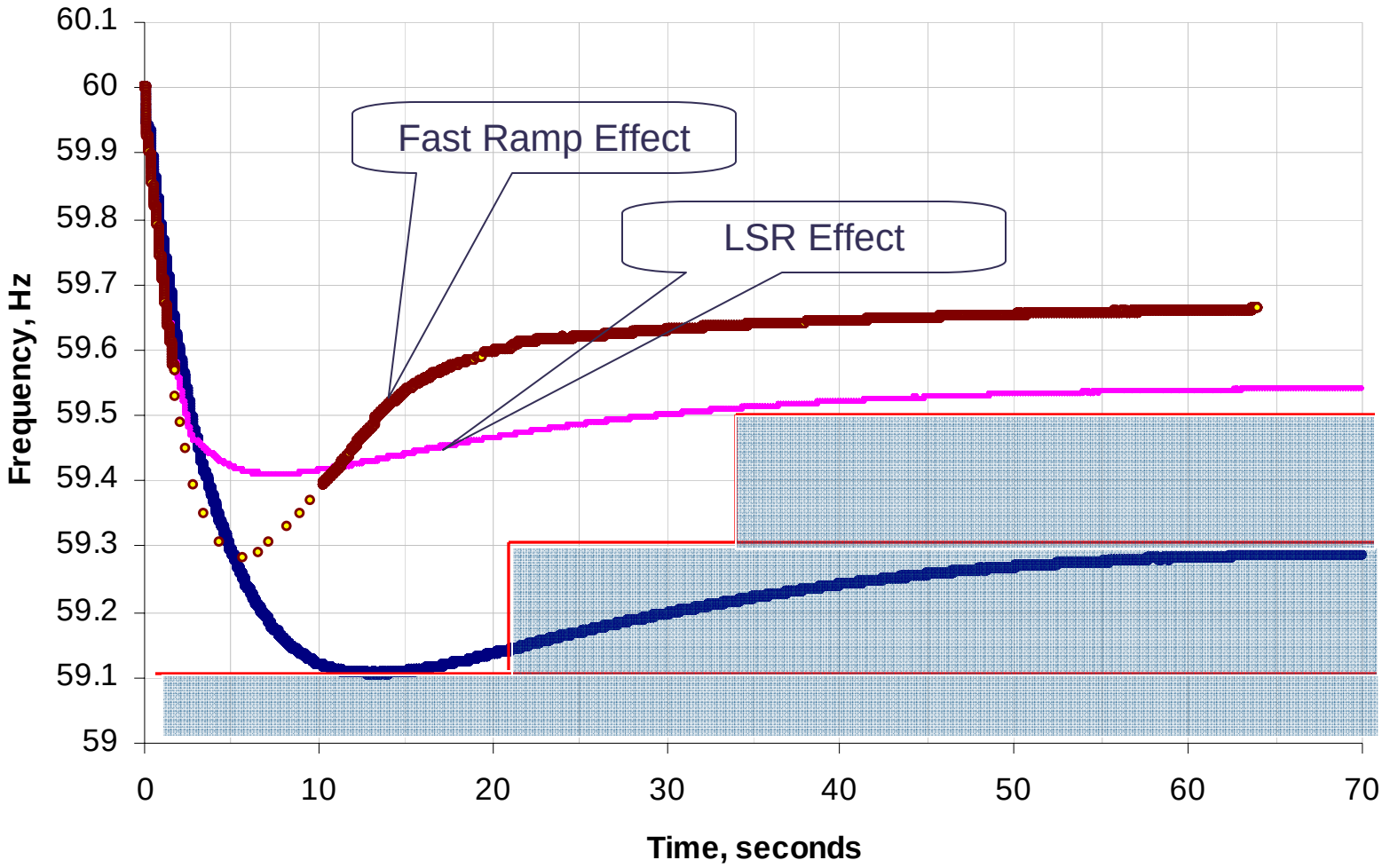
AB – BC Tie Line Trip Study

- Criteria for acceptable performance post tie line trip
  - a) System frequency does not dip below 59.1 Hz (1st block of UVLS)
  - b) The system remains stable
  - c) Initial recovery does not activate the UVLS delay blocks (15, 30, 60 seconds)
- Results
  - Without mitigation, the BC import limit is between 360 and 480 MW (depending on the AIL level)
  - To retain current import capability of 780 MW, up to 485 MW of under frequency load shed resource (LSR) would be required
    - This is based on the most constraining system conditions
      - 8400 MW AIL
      - 780 MW Import
  - Local under frequency relays tripping feeders is as effective as high speed tripping
  - System dynamic model was validated

System Frequency Response
No LSR, No Fast Ramp



System Frequency Response
Effects of LSR and Fast Ramp



AB – BC Tie Line Trip Study Conclusions

- The frequency response in our system dynamic model was validated for tie trip at high import
- ILRAS and LSS could be replaced (and/or augmented) with a new service (LSR)
- Fast Ramp service useful in mitigating operation of the delay UFLS blocks

Operational Considerations

- The SC would direct the volume of LSR once net interchange schedule is known and adjust it accordingly (other variables are the AIL and individual loads on LSR feeders)
- LSR can be armed by TFO or a participant under the AESO's direction (need SCADA and control)
- The total LSR load armed at each site or area area cannot result in a different system performance violation (e.g. voltage limit exceeded when armed LSR load trips). This will be determined once LSR locations are known.
- The SC tools will need to reflect the volumes and diversity of LSR available
  - Need to know the total LSR load available, amount LSR armed and any other details e.g. rotation protocol, equalization of exposure, etc.
  - Current tie scheduling practice is hourly, dynamic scheduling will increase frequency of LSR arming changes
- Separating LSR/ILRAS between market and reliability adds some complexity

LSR – Details

- Service armed only when needed – AIL and import level
- Individual feeders tripped by local under frequency relay if the frequency dips below the set point. (nominally 59.5 Hz.)
- Loads providing LSR must be telemetered via SCADA and be able to be armed in discreet amounts (determined by feeder configuration)
- Total LSR requirement is up to 485 MW

  * Note that this applies at 8400 MW AIL and 780 MW import, a worst case condition.

Fast Ramp – Details

- Fast ramps generator output within 15-30 seconds (Brazeau can increase output by as much as 190 MW in less than a minute) The fast ramping is triggered when the frequency stays below 59.5 Hz and remains enabled until system frequency reaches 59.9 Hz or units reach contracted output.
- Even though this requirement is worded around a generation increase, the tripping of load could provide the service depending on the provider's load shedding capabilities.
- Currently fast ramp is always armed, however it is recommended to be an armed when necessary service.

What happens if the less than the requested amount of LSR is contracted?

- Options
  - Limit BC import capability at the LSR contract amount
  - Continue to access LSR and ILRAS for reliability purposes through regulated means

Next Steps

- Procurement
- Evaluation of the response from the load customers
  - May need more analysis to confirm feasibility (e.g. excessive voltage deviations)
- Contracting
- Implementation
  - OPP development
  - SCADA and operating tools
  - Training

Appendix I
LSR – Requirements [1-4 of 9]

R1 – Location

- Must be connected within the Alberta control area. It can be connected at transmission or distribution level. Distribution level services may also require consideration of distribution provider's tariff terms and conditions.

R2 – Load Characteristics

- The supplier must provide the AESO with a written description of the load characteristics, i.e. seasonal load factor, daily usage patterns, external influences on the load including pool price sensitivity, other industrial process or feedstock dependencies, or other market sensitivities.

R3 – Minimum and Maximum Capacity Volume

- The minimum capacity volume for any single provider is 5 MW. The minimum arming capacity is 5 MW. Based on location, load characteristics, and proximity of other loads providing this service, there may be a limit on the maximum capacity volume. This will be determined by the AESO.

R4 – Restoration

- Once curtailed, the load cannot be restored without System Controller approval.

Appendix I
LSR – Requirements cont'd [5-7]

R5 – Relay Requirements

- The supplier will equip its facilities with a frequency relay, which, when armed trip load automatically within 0.2 seconds (12 cycles) should system frequency reach the trigger frequency (59.5 Hz or other as specified by the AESO)

R6 – Arming Requirements

- The supplier will be able to arm and disarm discreet volumes of service. These discreet volumes are expected to be function of the service provider facilities.
- The armed volume will be directed by the System Controller in accordance with system needs.

R7 – Telemetry

- The supplier shall maintain telemetry signals to the System Controller that reflect the real time volume of service available for automatic trip and the amount of LSR that is armed. Communication and monitoring must be provided to the System Controller.

Appendix I
LSR – Requirements cont'd [8-9]

R8 – Availability

- R8.1 The supplier must coordinate planned and unplanned unavailability of the service.
- R8.2 The supplier must coordinate planned outages to the service through outage coordination provisions in OPP 601 Outage Scheduling
- R8.3 The supplier must immediately advise AESO of unplanned outages, including forced outages. The estimate return to service time must be included.

R9 – Technical Standards and Compliance with the ISO Rules

- R9.1 The service provider must comply with the following AESO Technical Standards
  - Operational Voice Standard
  - SCADA Standard
  - Protection Standard
  - Transmission Data Requirements
  - Generator and Load Interconnection Standard
- R9.2 The service provider must comply with the ISO Rules.

Appendix II
FR – Requirements

R1 – Relay Requirements

- The generation (or load) providing the service will be set to operate automatically at the trigger frequency with an intentional time delay of 1.5 seconds for selectivity purposes. The relay must terminate the fast ramp service at 59.9 Hz without any time delay. The relay will have the capability of being turned ON or OFF as necessary.

R2 – Eligibility

- In order to be eligible for such a service, a particular generator will have to be capable of providing the contracted MW amount within no more than 30 seconds and should also be sustainable at that level for at least 30 minutes.
- The contracted amount cannot be less than 10 MW.

R3 – Arming Requirements

- The supplier will be able to arm and disarm this service only as directed by the SC.

R4 – Availability

- The fast ramp service supplier will inform the SC if this service becomes unavailable and when it becomes again available after a planned or forced outage.

Appendix III
New OPP-312 Table1 – LSR

Old table coverage

BCTC Import	AIL (MW)																				
	6600 to 6800	6801 to 7000	7001 to 7200	7201 to 7400	7401 to 7600	7601 to 7800	7801 to 8000	8001 to 8200	8201 to 8400	8401 to 8600	8601 to 8800	8801 to 9000	9001 to 9200	9201 to 9400	9401 to 9600	9601 to 9800	9801 to 10000	10001 to 10200	10201 to 10400	10401 to 10600	10601 to 10800
350	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
375	17	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
400	50	40	30	20	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
425	83	73	63	53	43	33	23	13	3	0	0	0	0	0	0	0	0	0	0	0	0
450	115	105	95	85	75	65	55	45	30	20	10	0	0	0	0	0	0	0	0	0	0
475	148	138	128	118	108	98	88	78	63	53	43	33	23	13	3	0	0	0	0	0	0
500	180	170	160	150	140	130	120	110	95	85	75	65	55	45	35	26	16	9	0	0	0
525	213	203	193	183	173	163	153	143	128	118	108	98	88	78	68	59	49	42	32	22	8
550	245	235	225	215	205	195	185	175	160	150	140	130	120	110	100	91	81	74	64	54	40
575	278	268	258	248	238	228	218	208	193	183	173	163	153	143	133	124	114	107	97	87	73
600	310	300	290	280	270	260	250	240	225	215	205	195	185	175	165	156	146	139	129	119	105
625	342	333	323	313	303	293	283	273	258	248	238	228	218	208	198	189	179	172	162	152	138
650	X	365	355	345	335	325	315	305	290	280	270	260	250	240	230	221	211	204	194	184	170
675	X	X	X	378	368	358	348	338	323	313	303	293	283	273	263	254	244	237	227	217	203
700	X	X	X	X	401	390	380	370	355	345	335	325	315	305	295	286	276	269	259	249	235
725	X	X	X	X	X	X	408	398	388	378	368	358	348	338	328	319	309	302	292	282	268
750	X	X	X	X	X	X	X	430	423	413	403	393	383	373	363	354	344	337	327	317	303
775	X	X	X	X	X	X	X	X	X	446	436	426	416	406	396	387	377	370	360	350	336
800	X	X	X	X	X	X	X	X	X	481	471	461	451	441	431	422	412	405	395	385	371

Note: X denotes the operating conditions outside our current operating limits

Procurement Process – Recent History

- LSS
  - Dec 2005 - AESO successfully contracted for LSS by way of competitive process
  - Four respondents – contracted with three respondents for 150MW
  - Since 2005, contracted MW has dropped to 110MW
  - Contracts expire Dec 2008
  - 2007 cost = $4.9M **MARGINALLY CONTESTABLE**

- ILRAS
  - Dec 2006 - AESO issued EOI for 240MW
  - 240MW responded to EOI – some respondents more committed than others
  - Process did not go any further – declared non competitive
  - Modified ILRAS contract in place with Fortis - expires Aug 2008
  - 2006 cost = $800K, 2007 cost = $4K **DECLARED NON CONTESTABLE**

- Brazeau Fast Ramp Service
  - Contract bi-laterally negotiated between AESO and TransAlta
  - Contract expired Feb 2008
  - 2007 cost = $640K **YET TO BE COMPETITIVELY PROCURED**

Procurement Process – Go Forward

- Scenario 1 – LSR/Fast Ramp Contestable
  - Issue EOI May 2008
  - Issue RFP June/July 2008
  - Award contracts September 2008
  - Providers enabled October 2008 – December 2009
- Scenario 2 – LSR/Fast Ramp non-Contestable
  - Issue EOI May 2008
  - Next steps?
- What is contestable? AESO AS Procurement Process yet to be finalized.