Athena 3 Rules, 2/28/2012

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1. Overview

Athena includes a number of rule sets:

- The Driver Assessment Model (DAM) is responsible for assessing the implications of simulated events and situations (drivers); it does this by means of *rules* which are grouped into *rule sets*, one rule set for each kind of driver. These are referred to as the DAM rules and rule sets.

This document describes each of Athena's rule sets in a form suitable for use by Athena modelers, developers, subject matter experts, and analysts.

1.1 Changes

Version	Section	Description
3.0.26	7	Added Section 7, Service Situations
3.0.22	3	Added Section 3, Political Events.
3.0.1	*	All ORG satisfaction effects are removed.
2.0.5	*	Incorporates changes from the JNEM SME meetings of Spring, 2010. Many magnitudes and p's and q's have changed. In addition: • DMGCULT is now CULSITE • DMGSACRED is now RELSITE • FOODSHRT now has effect at inception • GARBAGE spawns disease after 2 days (previously did not spawn) • NOWATER spawns disease after 2 days (previously 1 day)
2.0.4	5	Added the UNEMP demographic situation.
1.0.15	1.4	Added description of how coverage is applied as a multiplier, including the names of the nominal coverage parameters.
1.0.8	*	Incorporates changes from the SME meetings of 16-18 June 2009. • Deleted BIO and CHEM • Replaced MOSQUE with DMGSACRED • Added DMGCULT • Added MINEFIELD • Updated all spawn times • Added auto-resolution times

Version	Section	Description
		• Added DISPLACED
1.0.7	*	Initial version; modified from the Athena 4.0 rules document.

1.2 Related Documents

The *Athena 3.0 Analyst's Guide* provides full details of the models with which these rule sets interact.

1.3 Rule Set Taxonomy

The rule sets are grouped by class, as follows:

- Events
  - Civilian Casualties
  - Political Events
- Situations
  - Environmental Situations
  - Force Activity Situations
  - Organization Activity Situations
  - Civilian Activity Situations
  - Demographic Situations
  - Service Situations

This section details the concepts and conventions used by the document as a whole. The section for each kind of rule set begins with a discussion of the concepts and conventions relating to that particular kind of rule set.

1.4 Satisfaction Inputs

The purpose of the DAM rule sets is to provide satisfaction and cooperation inputs to the Generalized Regional Analysis Model (GRAM) given the events and situations. This section explains what satisfaction inputs look like.

Civilians: GRAM tracks satisfaction for civilian groups resident in the playbox (e.g., Pashtuns in Pakistan).

Satisfaction levels: GRAM tracks satisfaction along several axes, called *concerns*. A satisfaction level is a number from –100.0 to 100.0, where 0.0 is neutral. The concerns are as follows:

- Autonomy (AUT): Do the civilians feel in control of their country?
- Safety (SFT): Are they in fear for their lives?
- Culture (CUL): Satisfaction with respect to cultural and religious issues.
- Quality of Life (QOL): How do they feel about their quality-of-life?

Satisfaction changes: Satisfaction change is expressed in points, i.e., a 5.0 point change, a 10.0 point change, a –3.0 point change. A 10.0 point change nominally moves a satisfaction level 10% of the way toward 100.0 from its current position; a –10.0 point change nominally moves a satisfaction level 10% of the way toward –100.0. In practice, there are a variety of factors in GRAM which will determine the effect a given input actually has.

Magnitudes: For convenience, the rule sets describe satisfaction changes using the following *magnitude symbols*:

XXXXL–	XXXL–	XXL–	XL–	L–	M–	S–	XS–	XXS–	XXXS–
–30.0	–20.0	–15.0	–10.0	–7.5	–5.0	–3.0	–2.0	–1.5	–1.0

XXXS+	XXS+	XS+	S+	M+	L+	XL+	XXL+	XXXL+	XXXXL+
1.0	1.5	2.0	3.0	5.0	7.5	10.0	15.0	20.0	30.0

LEVEL Inputs: A LEVEL input changes a satisfaction level by a particular amount over a particular period of time, called the realization time. The realization time is expressed in decimal days. LEVEL inputs are used for events, including significant events in the life of a situation (e.g., resolution of an environment situation.)

SLOPE Inputs: A SLOPE input changes a satisfaction level at a particular rate, so long as a situation is on-going. SLOPE inputs can be updated as a situation changes, or terminated when the situation ends.

Direct and Indirect Effects: The rules express the *direct effect* of an event or situation on a group or groups within a particular neighborhood. The direct effect on a group *f* in a neighborhood *n* will usually have an indirect effect on the other groups in the same neighborhood, and possibly on groups in other neighborhoods. Indirect effects depend on the relationship between the groups and on the proximity of the neighborhoods.

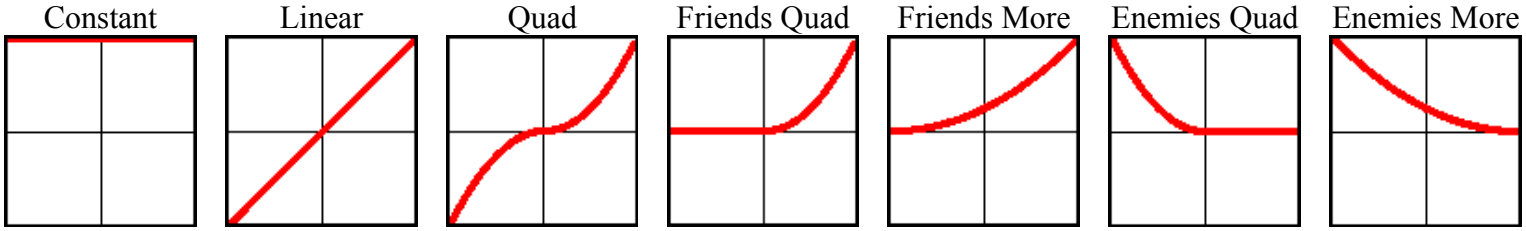
Near Factor (*p*) and Far Factor (*q*): Each rule set defines a near factor, p, and a far factor, q. These are used as multipliers when determining the strength of indirect effects in other neighborhoods. If $p = 0.25$, then the indirect effect in a near neighborhood will be 25% of the effect in this

neighborhood; if $q = 0.1$, then the indirect effect in a far neighborhood will be 10% of the effect in this neighborhood.[1]

[1]DAM also supports a "Here Factor" (s) that applies to indirect effects in the same neighborhood; it defaults to 1.0, and is not changed by the rule sets.

Magnitude Multipliers: Some rule sets will specify the magnitude of a satisfaction input as a magnitude symbol times one or more multipliers. In the activity rules, CURFEW-1.1, for example, the change in AUT is "*cov* × M–". Here, as stated in the introduction that section, the meaning is that the input will be M– at some nominal coverage, and will be larger or smaller as *cov* differs from the nominal value.[2]

Relationship Multipliers: Some of the force activity rule sets make use of *relationship multiplier functions*, which are described in detail in the *Mars Analyst's Guide*. Here, the relationship between the affected civilian group and the force group doing the activity is fed to a function whose result is used as a multiplier. The function returns 1.0 at the *nominal relationship*. The names and shapes of the relationship multiplier functions are indicated by the following icons, which are drawn presuming a nominal relationship of of ±1.0.



The default nominal relationship is ±0.6, which stretches the curves vertically. The rule sets indicates the use of an RMF by including one of these symbols (e.g., **quad**) as a multiplier on a magnitude, e.g., "*cov* × **quad** × M+".

Causes: Every rule set is associated with a "cause". The neighborhood satisfaction model presumes that satisfaction levels can only be changed so much for any given reason, or "cause". Thus, if a particular group in a particular neighborhood is affected by multiple inputs at the same time, all of which have the same cause, only the strongest positive and negative effects are applied; these effects are called *anchors*. For example, if group A in neighborhood N1 is suffering from an epidemic (the EPIDEMIC abstract situation), then it is unlikely that the effect on A will be increased significantly if the epidemic spreads to neighborhood N2, next door.

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[2] Thus, $cov = \left(\frac{cov_{actual}}{cov_{nominal}} \right)$, where cov_{actual} is the actual coverage, and $cov_{nominal}$ is the nominal coverage. The nominal coverage is set by a parameter; for example, the nominal coverage for activity situations is `dam.actsit.nominalCoverage`. and the nominal coverage for environmental situations is `dam.ensit.nominalCoverage`.

1.5 Cooperation Inputs

Cooperation is a relationship between two groups, expressed as a percentage from 0 to 100, that indicates the likelihood that the first group will *cooperate* with second. Here, "cooperation" is a term of art from the Human Intelligence (HUMINT) community; to cooperate is to provide information. Athena models the cooperation of neighborhood groups with force groups.

Cooperation inputs are expressed using the same notation as satisfaction inputs.

1.6 Rule Set Parameters

Each rule set depends on a number of input values, which are listed at the top of each rule set.

Model Parameters: These are inputs which are used to calibrate the model, and which consequently don't usually change from one scenario to another, at least within a given part of the world. For satisfaction rule sets, for example, they include *p*, the "near factor, *q*, the "far factor", and the *cause*, as described above; they may also include parameters specific to a rule set. These parameters are defined in Athena's model parameter database, which is documented by the **parmdb(5)**[3] man page, part of the on-line documentation distributed with Athena.

In **parmdb(5)**, the parameters relating to a particular rule set have names like **dam.*ruleset*.***, where **dam** is the Athena module, *ruleset* is the rule set name, and ***** is a wild card. For example, the "near factor" for the BADFOOD rule set is called **dam.BADFOOD.nearFactor**. In addition, some of the parameters which apply to the activity rule sets have names like **activity.*ruleset*.***. The coverage function for the PATROL activity, for example, is defined by the parameter **activity.PATROL.coverage**. A notable parameter not explicitly called out in the rule sets is the "active" flag, e.g., **dam.BADFOOD.active**; this is a boolean flag that indicates whether the rule set is active or not. It is generally set to true, but if false the rule set will never be triggered, and no rules in the rule set will fire.

The **parmdb(5)** man page, and this document, list the default values for these parameters. They can be modified from the Athena command line. Thus, when analyzing the behavior of a rule set for a given exercise, it's always worthwhile to check what the parameter values actually are. The values actually in use (including any interactive changes) can be queried from the Athena command line. For example, the following command will list all of the PATROL rule set parameters:

[3] The Athena software and related data formats are primarily documented in a series of "manual pages", usually referred to as "man pages". This virtual manual is divided up into several sections; section 5 is for file formats, and section 1 is for applications. Thus, **parmdb(5)** signifies the manual page that documents the file format for Athena's model parameter database. Similarly, **athena_sim(1)** signifies the manual page for the Athena Simulation itself.

```
> parm list dam.PATROL.*
```

Database Parameters: These are values from the Athena scenario database. This data varies from scenario to scenario, and generally is subscripted *.f* or *.n* or some combination, indicating that it's specific to a particular group or neighborhood. In addition, there are a vast number of parameters not explicitly called out in this document which affect how attitude inputs are used by GRAM, such as group relationships, neighborhood proximities, and so forth.

Input Gains: Another parameter, the *input gain*, is defined for satisfaction and cooperation inputs for every rule. The gain for a particular rule is a multiplier that can dial the effect of the rule up or down. It defaults to 1.0, and so usually has no effect. If changed to 2.0, say, the rule's effect is doubled; if changed to 0.5, the rule's effect is halved. Note that changing the gain only affects subsequent rule firings. The parameters are called `dam.`*`rule`*`.satgain` and `dam.`*`rule`*`.coopgain`.

Driver Parameters: Finally, there are the parameters of the driver for which the rule set was triggered. These are documented in each rule set.

2. Casualties

Athena assesses the attitude implications of civilian group casualties. Attrition is assessed once a week[4], and covers the implications of all attrition for the past week. See the Athena Analyst's Guide section on the Athena Attrition Model (AAM) for more details.

[4] Or, rather, every so many ticks, as determined by the parmdb(5) parameter `aam.ticksPerTock`.

CIVCAS: Civilian Casualties

Aggregate Event: A neighborhood group has taken casualties over the previous week.

cause = CIVCAS	*n* = The neighborhood in which the casualties were incurred
p = 0.25	*f* = The group that took the casualties
q = 0.1	

Satisfaction Effects: Neighborhood group *nf*.

casualties = The number of casualties
mult = The casualty multiplier, computed using Z-curve `dam.CIVCAS.Zsat` (lo=0.3, a=1.0, b=100.0, hi=2.0)

1. Casualties to Civilians: Satisfaction Effects	Effect	By	AUT	SFT	CUL	QOL
1.1: Civilian casualties taken	LEVEL time		*mult* × L– 2 days	*mult* × XL– 2 days		*mult* × L– 2 days

Cooperation Effects: Neighborhood group *nf*, with all force groups *g* involved in causing casualties to *nf* during the week.

g = A force group involved in causing the casualties
R = The relationship between *nf* and *g*
casualties = The number of casualties in which *g* was involved
mult = The casualty multiplier, computed using Z-curve `dam.CIVCAS.Zcoop` (lo=0.3, a=1.0, b=100.0, hi=2.0)

2. Casualties to Civilians: Cooperation Effects	Effect	By	Coop
2.1 Civilian casualties taken from force group	LEVEL time	*g*	*mult* × **enmore** × M– 2 days

Other Effects: None

Note: The effects shown above were taken "as is" from the JNEM CIVCAS rule set. The only significant difference is the selected Z-curve.

3. Political Events

Athena assesses the attitude implications of political events, and particular of shifts in the control of particular neighborhoods. The models driving a shift in control are described in the *Athena Analyst's Guide*. For any shift in control, there are three entities involved:

- The neighborhood, *n*, of which control shifted.
- The actor *a* who lost control, if any.
- The actor *b* who gained control, if any.

A neighborhood can be in a "state of chaos", in which no actor is in control; thus, there are three cases, as described in the CONTROL rule set:

- Actor *a* loses control of neighborhood *n* to actor *b*.
- Actor *a* loses control; neighborhood *n* is now in a state of chaos.
- Actor *b* gains control of neighborhood *n*, which was previously in a state of chaos.

CONTROL: Shift in Control of Neighborhood

Event: Political control of a neighborhood has shifted

cause	= CONTROL	*n*	= The neighborhood of which the control shifted.	*DV*	= *V.fb* - *V.fa*
p	= 0.2	*a*	= The actor that lost control, or none.	*V.fa*	= Vertical relationship of *f* with *a*.
q	= 0.0	*b*	= The actor that gained control, or none.	*V.fb*	= Vertical relationship of *f* with *b*.

Effects: Civilian group *f* in *n*. All effects are LEVEL effects with a realization time of 7 days.

1. Effects	Effect	Magnitudes	
1.1: Neighborhood sees shift in control Actor *a* was in control, actor *b* is now in control.	AUT	$1.4 < DV \leq 2.0$	XXXL+
		$1.0 < DV \leq 1.4$	XXL+
		$0.6 < DV \leq 1.0$	L+
		$0.2 < DV \leq 0.6$	M+
		$-0.2 \leq DV \leq 0.2$	0
		$-0.6 \leq DV < -0.2$	M-
		$-1.0 \leq DV < -0.6$	L-
		$-1.4 \leq DV < -0.6$	XXL-
		$-2.0 \leq DV < -1.4$	XXXL-
	Coop with all force group *g* owned by *a*	*V.fa* = SUPPORT	S+
		V.fa = LIKE	0
		V.fa = INDIFF	S-
		V.fa = DISLIKE	M-
		V.fa = OPPOSE	L-
	Coop with all force group *h* owned by *b*	*V.fa* = SUPPORT	L+
		V.fa = LIKE	M+
		V.fa = INDIFF	S+
		V.fa = DISLIKE	0
		V.fa = OPPOSE	0

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1.2: Neighborhood is now in chaos Actor *a* has lost control; no actor has gained control.	AUT	*V.fa* = SUPPORT	XXL-
		V.fa = LIKE	XL-
		V.fa = INDIFF	S-
		V.fa = DISLIKE	L+
		V.fa = OPPOSE	XL+
	Coop with all force group *g* owned by *a*	*V.fa* = SUPPORT	XL+
		V.fa = LIKE	L+
		V.fa = INDIFF	S-
		V.fa = DISLIKE	L-
		V.fa = OPPOSE	XL-
	Coop with all force group *h* **not** owned by *a*	*V.fa* = SUPPORT	L+
		V.fa = LIKE	M+
		V.fa = INDIFF	S+
		V.fa = DISLIKE	0
		V.fa = OPPOSE	0
1.3: Neighborhood is no longer in chaos Actor *b* has gained control; no actor was previously in control.	AUT	*V.fa* = SUPPORT	XXL+
		V.fa = LIKE	XL+
		V.fa = INDIFF	S+
		V.fa = DISLIKE	L-
		V.fa = OPPOSE	XL-
	Coop with all force group *g* owned by *b*	*V.fa* = SUPPORT	L+
		V.fa = LIKE	M+
		V.fa = INDIFF	S+
		V.fa = DISLIKE	0
		V.fa = OPPOSE	0
Other Effects: None			

4. Environmental Situations

An *environmental situation*, or *ensit*, is an ongoing situation in a particular neighborhood that affects the attitudes of the civilians who live in that neighborhood that is not directly due to the presence or activities of units belonging to force or organization groups, e.g., disease due to poor sanitation, power outages due to degraded or destroyed infrastructure, and so forth.

Coverage: Every ensit has a *coverage fraction*, a number from 0.0 to 1.0, that indicates the fraction of the neighborhood's population that is affected by the situation. This fraction is set when the situation is created, and doesn't change thereafter.

Spawning of Environmental Situations: Certain environmental situations, if left unresolved for a sufficient period of time, will spawn additional environmental situations. A contaminated food supply, for example, will spawn disease.

Mitigation of Environmental Situations: Certain force and organization group activities can mitigate the effects of particular types of environmental situations. The activities that mitigate a situation are listed with each rule set; note, however, that the mitigation is effected by the activity rule set, not here.

Rule Set Triggers: An environmental situation rule set is triggered by the following events:

- **Inception:** Most ensits have a negative level effect, or *inception penalty*, on creation. The analyst may choose to avoid the inception penalty when creating an ensit. Every ensit also has an on-going slope effect; this begins at inception as well.

- **Resolution:** When an ensit is resolved it may have a positive level effect, or *resolution benefit*. In addition, all on-going effects are terminated.

- **Monitoring**: The rules governing the rule set's on-going effects are evaluated every tick, looking for changing factors.

Most ensit rule sets have three subsets: one for inception, one for on-going effects, and one for resolution. The inception and on-going effects subsets are triggered at inception; the on-going effects subset can be triggered on its own while the situation is on-going, to catch changes in effect due to external considerations; and the resolution subset is triggered at situation resolution.

Rule Set Summary

Rule Set	Cause	*p*	*q*	Effect		AUT		SFT	CUL	QOL
						Outsiders	Locals			
BADFOOD	HUNGER	0.0	0.0	Inception	*cov* ×					L–
				Ongoing	*cov* ×	M–		XXXS–		L–
				Resolution	*cov* ×	M+	L+			XL+
BADWATER	THIRST	0.0	0.0	Inception	*cov* ×					L–
				Ongoing	*cov* ×	M–		XXXS–		L–
				Resolution	*cov* ×	M+	L+			XL+
COMMOUT	COMMOUT	0.1	0.1	Inception	*cov* ×			S–	XS–	M–
				Ongoing	*cov* ×			S–	S–	XL–
				Resolution	*cov* ×			M+	M+	XXL+
CULSITE	CULSITE	0.1	0.1	Inception	*cov* ×				XL–	XXXS-
				Ongoing	*cov* ×				XL–	
				Resolution	*cov* ×				M+	XXXS+
DISASTER	DISASTER	0.0	0.0	Inception	*cov* ×			L–		XL–
				Ongoing	*cov* ×			L–		XXL–
				Resolution	*cov* ×	L+	XL+	XL+		XXL+
DISEASE	SICKNESS	0.25	0.0	Inception	*cov* ×	S–		M–		L–
				Ongoing	*cov* ×	S–		L–		XL–
				Resolution	*cov* ×	L+	XXL+	XXL+		XXL+
EPIDEMIC	SICKNESS	0.5	0.2	Inception	*cov* ×	L–		M–		XL–
				Ongoing	*cov* ×	L–		L–		XXL–
				Resolution	*cov* ×	XL+	XXL+	XXL+		XXL+
FOODSHRT	HUNGER	0.1	0.0	Inception	*cov* ×					S–
				Ongoing	*cov* ×	M–				L–
				Resolution	*cov* ×	L+	XXL+			XL+

Rule Set Summary (continued)

Rule Set	Cause	*p*	*q*	Effect		AUT		SFT	CUL	QOL
						Outsiders	Locals			
FUELSHRT	FUELSHRT	0.1	0.0	Inception	*cov* ×					L–
				Ongoing	*cov* ×	M–				XL–
				Resolution	*cov* ×	L+	XL+			XXL+
GARBAGE	GARBAGE	0.0	0.0	Inception	*cov* ×	XXS–		S–		S–
				Ongoing	*cov* ×	M–		M–		L–
				Resolution	*cov* ×	L+	XL+	L+		XL+
INDSPILL	INDSPILL	0.0	0.0	Inception	*cov* ×			L–		L–
				Ongoing	*cov* ×	M–		S–		L–
				Resolution	*cov* ×	M+	XL+	XXL+		XXL+
MINEFIELD	ORDNANCE	0.2	0.0	Inception	*cov* ×	L–		XXL–		XXXL–
				Ongoing	*cov* ×	L–		XXL–		XXL–
				Resolution	*cov* ×	M+	XXXL+	XXXL+		XXXL+
NOWATER	THIRST	0.1	0.0	Inception	*cov* ×	M–				XL–
				Ongoing	*cov* ×	L–				XXXL–
				Resolution	*cov* ×	XL+	XXL+			XXXL+
ORDNANCE	ORDNANCE	0.0	0.0	Inception	*cov* ×	S–		XXL–		XXL–
				Ongoing	*cov* ×	L–		XXL–		XXL–
				Resolution	*cov* ×	L+	XL+	XXXL+		XXXL+
PIPELINE	PIPELINE	0.0	0.0	Inception	*cov* ×	S–		XXS–		XL–
				Ongoing	*cov* ×	M–		XXS–		XXL–
				Resolution	*cov* ×	L+	XL+	L+		XXXL+

Rule Set Summary (continued)

Rule Set	Cause	*p*	*q*	Effect		AUT		SFT	CUL	QOL
						Outsiders	Locals			
POWEROUT	POWEROUT	0.1	0.0	Inception	*cov* ×	S–		S–		M–
				Ongoing	*cov* ×	M–		S–		L–
				Resolution	*cov* ×	L+	XXL+	L+		XL+
REFINERY	REFINERY	0.0	0.0	Inception	*cov* ×	M–		S–		XL–
				Ongoing	*cov* ×	L–		M–		XXL–
				Resolution	*cov* ×	XL+	XXXL+	XL+		XXL+
RELSITE	RELSITE	0.1	0.1	Inception	*cov* ×	S–		M–	XL–	M–
				Ongoing	*cov* ×	S–		S–	XL–	XS–
				Resolution	*cov* ×	M+	XL+	XL+	M+	M+
SEWAGE	SEWAGE	0.2	0.0	Inception	*cov* ×	S–				L–
				Ongoing	*cov* ×	M–				XL–
				Resolution	*cov* ×	L+	XL+			XXL+

BADFOOD: Contaminated Food Supply

Environmental Situation: The local food supply has been contaminated due to a natural disaster or collateral damage to infrastructure, rather than evil intent.

cause = HUNGER	*n* = The affected neighborhood	*cov* = Coverage Fraction	
p = 0.0	*g* = The group that resolved the situation, if known	*state* = Situation state	
q = 0.0	*local.g* = Whether or not group *g* is local to the region		

Spawns: DISEASE after 1 day. **Auto-resolve after:** 10 days

Mitigated by: CMO_CONSTRUCTION, CMO_OTHER

Satisfaction Effects: All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov*.

1. Situation Inception	Effect	By	AUT	SFT	CUL	QOL
1.1: Food supply is contaminated New situation	LEVEL time					*cov* × L– 2 days
2. Ongoing Effects						
2.1: Food supply continues to be contaminated *state* != ENDED	SLOPE Thresh		*cov* × M– -100, 100	*cov* × XXXS– -100, 100		*cov* × L– -100, 100
2.2: Food supply is no longer contaminated *state* = ENDED	SLOPE		Terminate slope effects			
3: Situation Resolution						
3.1: Food contamination is resolved by outsiders *g* is unknown or *local.g* is false	LEVEL time	*g*	*cov* × M+ 2 days			*cov* × XL+ 2 days
3.2: Food contamination is resolved by locals *g* is known and *local.g* is true.	LEVEL time	*g*	*cov* × L+ 2 days			*cov* × XL+ 2 days

Other Effects: None

BADWATER: Contaminated Water Supply

Environmental Situation: The local water supply has been contaminated due to a natural disaster or collateral damage to infrastructure, rather than evil intent.

cause = THIRST	*n* = The affected neighborhood	*cov*	= Coverage Fraction
p = 0.0	*g* = The group that resolved the situation, if known	*state*	= Situation state
q = 0.0	*local.g* = Whether or not group *g* is local to the region		

Spawns: DISEASE after 1 day. **Auto-resolve after:** 5 days

Mitigated by: CMO_CONSTRUCTION, CMO_INFRASTRUCTURE, CMO_OTHER

Satisfaction Effects: All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov*.

1. Situation Inception	Effect	By	AUT	SFT	CUL	QOL
1.1: Water supply is contaminated New situation	LEVEL time					*cov* × L– 2 days
2. Ongoing Effects						
2.1: Water supply continues to be contaminated *state* != ENDED	SLOPE Thresh		*cov* × M– -100, 100	*cov* × XXXS– -100, 100		*cov* × L– -100, 100
2.2: Water supply is no longer contaminated *state* = ENDED	SLOPE		Terminate slope effects			
3: Situation Resolution						
3.1: Water contamination is resolved by outsiders *g* is unknown or *local.g* is false	LEVEL time	*g*	*cov* × M+ 2 days			*cov* × XL+ 2 days
3.2: Water contamination is resolved by locals *g* is known and *local.g* is true.	LEVEL time	*g*	*cov* × L+ 2 days			*cov* × XL+ 2 days

Other Effects: None

TBD: Might need two ensits: can boiling the water resolve the problem, or not.

COMMOUT: Communications Outage

Environmental Situation: Communications (TV? Cell phones?) are out in the local area.					
cause = COMMOUT *p* = 0.1 *q* = 0.1	*n* = The affected neighborhood *g* = The group that resolved the situation, if known *local.g* = Whether or not group *g* is local to the region			*cov* = Coverage Fraction *state* = Situation state	
Spawns: Nothing **Auto-resolve after:** 7 days					
Mitigated by: CMO_CONSTRUCTION, CMO_INDUSTRY, CMO_INFRASTRUCTURE, CMO_OTHER					
Satisfaction Effects: All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov*.					
1. Situation Inception	**Effect**	**By**	**AUT**	**SFT**	**CUL**	**QOL**
1.1: Communications go out New situation	LEVEL time			*cov* × S– 2 days	*cov* × XS– 2 days	*cov* × M– 2 days
2. Ongoing Effects						
2.1: Communications remain out *state* != ENDED	SLOPE Thresh			*cov* × S– -100, 100	*cov* × S– 2 days	*cov* × XL– -100, 100
2.2: Communications are no longer out *state* = ENDED	SLOPE		Terminate Slope Effects			
3: Situation Resolution						
3.1: Communications are restored by outsiders *g* is unknown or *local.g* is false	LEVEL time	*g*		*cov* × M+ 2 days	*cov* × M+ 2 days	*cov* × XXL+ 2 days
3.2: Communications are restored by locals *g* is known and *local.g* is true.	LEVEL time	*g*		*cov* × M+ 2 days	*cov* × M+ 2 days	*cov* × XXL+ 2 days
Other Effects: None						

CULSITE: Damage to Cultural Site/Artifact

Environmental Situation: A significant cultural site or artifact is damaged, presumably due to kinetic action involving a force group.						
cause = CULSITE *p* = 0.1 *q* = 0.1	*n* = The affected neighborhood *g* = The group that resolved the situation, if known *local.g* = Whether or not group *g* is local to the region			*cov* = Coverage Fraction *state* = Situation state		
Spawns: Nothing **Auto-resolve after:** 45 days						
Mitigated by: CMO_CONSTRUCTION, CMO_OTHER						
Satisfaction Effects: All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov*.						
1. Situation Inception	**Effect**	**By**	**AUT**	**SFT**	**CUL**	**QOL**
1.1: A cultural site is damaged New situation	LEVEL time				*cov* × XL– 2 days	*cov* × XXXS– 2 days
2. Ongoing Effects						
2.1: Damage has not been resolved *state* != ENDED	SLOPE Thresh				*cov* × XL– -100, 100	
2.2: Damage is no longer causing resentment *state* = ENDED	SLOPE		Terminate Slope Effects			
3: Situation Resolution						
3.1: Damage is resolved by outsiders *g* is unknown or *local.g* is false	LEVEL time	*g*			*cov* × M+ 2 days	*cov* × XXXS+ 2 days
3.2: Damage is resolved by locals *g* is known and *local.g* is true.	LEVEL time	*g*			*cov* × M+ 2 days	*cov* × XXXS+ 2 days
Other Effects: None						

DISASTER: Disaster

Environmental Situation: A disaster has occurred in a neighborhood.						
cause = DISASTER *p* = 0.0 *q* = 0.0	*n* = The affected neighborhood *g* = The group that resolved the situation, if known *local.g* = Whether or not group *g* is local to the region			*cov* = Coverage Fraction *state* = Situation state		
Spawns: Nothing. **Auto-resolve after:** 45 days						
Mitigated by: CMO_CONSTRUCTION, CMO_HEALTHCARE, CMO_OTHER						
Satisfaction Effects: All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov*.						
1. Situation Inception	**Effect**	**By**	**AUT**	**SFT**	**CUL**	**QOL**
1.1: Disaster occurred in the neighborhood New situation	LEVEL time			*cov* × L– 2 days		*cov* × XL– 2 days
2. Ongoing Effects						
2.1: Disaster continues *state* != ENDED	SLOPE Thresh			*cov* × L– -100, 100		*cov* × XXL– -100, 100
2.2: Disaster has ended *state* = ENDED	SLOPE		Terminate Slope Effects			
3: Situation Resolution						
3.1: Disaster resolved by outsiders *g* is unknown or *local.g* is false	LEVEL time	*g*	*cov* × L+ 2 days	*cov* × XL+ 2 days		*cov* × XXL+ 2 days
3.2: Disaster resolved by locals *g* is known and *local.g* is true.	LEVEL time	*g*	*cov* × XL+ 2 days	*cov* × XL+ 2 days		*cov* × XXL+ 2 days
Other Effects: None						

DISEASE: Disease

Environmental Situation: General disease due to unsanitary conditions or environmental contamination.						
cause = SICKNESS *p* = 0.25 *q* = 0.0	*n* = The affected neighborhood *g* = The group that resolved the situation, if known *local.g* = Whether or not group *g* is local to the region			*cov* = Coverage Fraction *state* = Situation state		
Spawns: Nothing **Auto-resolve after:** 30 days						
Mitigated by: CMO_CONSTRUCTION, CMO_HEALTHCARE, CMO_OTHER						
Satisfaction Effects: All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov*.						
1. Situation Inception	**Effect**	**By**	**AUT**	**SFT**	**CUL**	**QOL**
1.1: Unhealthy conditions begin to cause disease New situation	LEVEL time		*cov* × S– 2 days	*cov* × M– 2 days		*cov* × XL– 2 days
2. Ongoing Effects						
2.1: Unhealthy conditions continue to cause disease *state* != ENDED	SLOPE Thresh		*cov* × S– -100, 100	*cov* × L– -100, 100		*cov* × XL– -100, 100
2.2: Unhealthy conditions are gone *state* = ENDED	SLOPE		Terminate Slope Effects			
3: Situation Resolution						
3.1: Unhealthy conditions are resolved by outsiders *g* is unknown or *local.g* is false	LEVEL time	*g*	*cov* × L+ 2 days	*cov* × XXL+ 2 days		*cov* × XXL+ 2 days
3.2: Unhealthy conditions are resolved by locals *g* is known and *local.g* is true.	LEVEL time	*g*	*cov* × XXL+ 2 days	*cov* × XXL+ 2 days		*cov* × XXL+ 2 days
Other Effects: None						

EPIDEMIC: Epidemic

Environmental Situation: Epidemic disease (other than biological weapons)						
cause = SICKNESS *p* = 0.5 *q* = 0.2	*n* = The affected neighborhood *g* = The group that resolved the situation, if known *local.g* = Whether or not group *g* is local to the region			*cov* = Coverage Fraction *state* = Situation state		
Spawns: Nothing **Auto-resolve after:** 360 days						
Mitigated by: CMO_CONSTRUCTION, CMO_HEALTHCARE, CMO_OTHER						
Satisfaction Effects: All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov*.						
1. Situation Inception	**Effect**	**By**	**AUT**	**SFT**	**CUL**	**QOL**
1.1: Epidemic begins to spread New situation	LEVEL time		*cov* × L– 2 days	*cov* × M– 2 days		*cov* × XL– 2 days
2. Ongoing Effects						
2.1: Epidemic continues to spread *state* != ENDED	SLOPE Thresh		*cov* × L– -100, 100	*cov* × L– -100, 100		*cov* × XXL– -100, 100
2.2: Epidemic is no longer spreading *state* = ENDED	SLOPE		Terminate Slope Effects			
3: Situation Resolution						
3.1: Spread of epidemic is halted by outsiders *g* is unknown or *local.g* is false	LEVEL time	*g*	*cov* × XL+ 2 days	*cov* × XXL+ 2 days		*cov* × XXL+ 2 days
3.2: Spread of epidemic is halted by locals *g* is known and *local.g* is true.	LEVEL time	*g*	*cov* × XXL+ 2 days	*cov* × XXL+ 2 days		*cov* × XXL+ 2 days
Other Effects: None						

TBD: Consider having the slope decay over time. (The resolution should probably also decrease over time....)

FOODSHRT: Food Shortage

Environmental Situation: There is a food shortage in the local area. **Note:** This situation never has an inception penalty.						
cause = HUNGER *p* = 0.1 *q* = 0.0	*n* = The affected neighborhood *g* = The group that resolved the situation, if known *local.g* = Whether or not group *g* is local to the region			*cov* = Coverage Fraction *state* = Situation state		
Spawns: Nothing **Auto-resolve after:** 180 days						
Mitigated by: CMO_CONSTRUCTION, CMO_INDUSTRY, CMO_OTHER						
Satisfaction Effects: All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov*.						
1. Situation Inception	**Effect**	**By**	**AUT**	**SFT**	**CUL**	**QOL**
1.1: Food begins to run short New situation	LEVEL time					*cov* × S– 2 days
2. Ongoing Effects						
2.1: Food has run short *state* != ENDED	SLOPE Thresh		*cov* × M– -100, 100			*cov* × L– -100, 100
2.2: Food is available *state* = ENDED	SLOPE		Terminate Slope Effects			
3: Situation Resolution						
3.1: Food shortage is ended by outsiders *g* is unknown or *local.g* is false	LEVEL time	*g*	*cov* × L+ 2 days			*cov* × XL+ 2 days
3.2: Food shortage is ended by locals *g* is known and *local.g* is true.	LEVEL time	*g*	*cov* × XXL+ 2 days			*cov* × XL+ 2 days
Other Effects: None						

FUELSHRT: Fuel Shortage

Environmental Situation: There is a fuel shortage in the local area.						
cause = FUELSHRT *p* = 0.1 *q* = 0.0	*n* = The affected neighborhood *g* = The group that resolved the situation, if known *local.g* = Whether or not group *g* is local to the region			*cov* = Coverage Fraction *state* = Situation state		
Spawns: Nothing **Auto-resolve after:** 30 days						
Mitigated by: CMO_CONSTRUCTION, CMO_INDUSTRY, CMO_OTHER						
Satisfaction Effects: All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov*.						
1. Situation Inception	**Effect**	**By**	**AUT**	**SFT**	**CUL**	**QOL**
1.1: Fuel begins to run short New situation	LEVEL time					*cov* × L– 2 days
2. Ongoing Effects						
2.1: Fuel continues to be in short supply *state* != ENDED	SLOPE Thresh		*cov* × M– -100, 100			*cov* × XL– -100, 100
2.2: Fuel is no longer in short supply *state* = ENDED	SLOPE		Terminate Slope Effects			
3: Situation Resolution						
3.1: Fuel shortage is resolved by outsiders *g* is unknown or *local.g* is false	LEVEL time	*g*	*cov* × L+ 2 days			*cov* × XXL+ 2 days
3.2: Fuel shortage is resolved by locals *g* is known and *local.g* is true.	LEVEL time	*g*	*cov* × XL+ 2 days			*cov* × XXL+ 2 days
Other Effects: None						

GARBAGE: Garbage

Environmental Situation: Garbage is piling up in the streets						
cause = GARBAGE *p* = 0.0 *q* = 0.0	*n* = The affected neighborhood *g* = The group that resolved the situation, if known *local.g* = Whether or not group *g* is local to the region			*cov* = Coverage Fraction *state* = Situation state		
Spawns: DISEASE after 2 days **Auto-resolve after:** 45 days						
Mitigated by: CMO_CONSTRUCTION, CMO_OTHER						
Satisfaction Effects: All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov*.						
1. Situation Inception	**Effect**	**By**	**AUT**	**SFT**	**CUL**	**QOL**
1.1: Garbage begins to accumulate New situation	LEVEL time		*cov* × XXS– 2 days	*cov* × S– 2 days		*cov* × S– 2 days
2. Ongoing Effects						
2.1: Garbage is piled in the streets *state* != ENDED	SLOPE Thresh		*cov* × M– -100, 100	*cov* × M– -100, 100		*cov* × L– -100, 100
2.2: Garbage is no longer piled in the streets *state* = ENDED	SLOPE		Terminate Slope Effects			
3: Situation Resolution						
3.1: Garbage is cleaned up by outsiders *g* is unknown or *local.g* is false	LEVEL time	*g*	*cov* × L+ 2 days	*cov* × L+ 2 days		*cov* × XL+ 2 days
3.2: Garbage is cleaned up by locals *g* is known and *local.g* is true.	LEVEL time	*g*	*cov* × XL+ 2 days	*cov* × L+ 2 days		*cov* × XL+ 2 days
Other Effects: None						

INDSPILL: Industrial Spill

Environmental Situation: Damage to an industrial facility has released possibly toxic substances into the surrounding area.

cause	= INDSPILL	*n*	= The affected neighborhood	*cov*	= Coverage Fraction
p	= 0.0	*g*	= The group that resolved the situation, if known	*state*	= Situation state
q	= 0.0	*local.g*	= Whether or not group *g* is local to the region		

Spawns: DISEASE after 5 days. **Auto-resolve after:** 90 days

Mitigated by: CMO_CONSTRUCTION, CMO_INDUSTRY, CMO_OTHER

Satisfaction Effects: All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov*.

1. Situation Inception	Effect	By	AUT	SFT	CUL	QOL
1.1: Industrial spill occurs New situation	LEVEL time			*cov* × L– 2 days		*cov* × L– 2 days
2. Ongoing Effects						
2.1: Industrial spill has not been cleaned up *state* != ENDED	SLOPE Thresh		*cov* × M– -100, 100	*cov* × S– -100, 100		*cov* × L– -100, 100
2.2: Industrial spill has been cleaned up *state* = ENDED	SLOPE		Terminate Slope Effects			
3: Situation Resolution						
3.1: Industrial spill is cleaned up by outsiders *g* is unknown or *local.g* is false	LEVEL time	*g*	*cov* × M+ 2 days	*cov* × XXL+ 2 days		*cov* × XXL+ 2 days
3.2: Industrial spill is cleaned up by locals *g* is known and *local.g* is true.	LEVEL time	*g*	*cov* × XL+ 2 days	*cov* × XXL+ 2 days		*cov* × XXL+ 2 days

Other Effects: None

MINEFIELD: Minefield

Environmental Situation: The civilians know that there is a minefield in the area.						
cause = ORDNANCE *p* = 0.2 *q* = 0.0	*n* = The affected neighborhood *g* = The group that resolved the situation, if known *local.g* = Whether or not group *g* is local to the region			*cov* = Coverage Fraction *state* = Situation state		
Spawns: Nothing. **Auto-resolve after:** 1080 days						
Mitigated by: CMO_CONSTRUCTION, CMO_OTHER						
Satisfaction Effects: All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov*.						
1. Situation Inception	**Effect**	**By**	**AUT**	**SFT**	**CUL**	**QOL**
1.1: Minefield is placed New situation	LEVEL time		*cov* × L– 2 days	*cov* × XXL– 2 days		*cov* × XXXL– 2 days
2. Ongoing Effects						
2.1: Minefield remains *state* != ENDED	SLOPE Thesh		*cov* × L– -100, 100	*cov* × XXL– -100, 100		*cov* × XXL– -100, 100
2.2: Minefield has been cleared *state* = ENDED	SLOPE		Terminate Slope Effects			
3: Situation Resolution						
3.1: Minefield is cleared by outsiders *g* is unknown or *local.g* is false	LEVEL time	*g*	*cov* × M+ 2 days	*cov* × XXXL+ 2 days		*cov* × XXXL+ 2 days
3.2: Minefield is cleared by locals *g* is known and *local.g* is true.	LEVEL time	*g*	*cov* × XXXL+ 2 days	*cov* × XXXL+ 2 days		*cov* × XXXL+ 2 days
Other Effects: None						

NOWATER: Interrupted Water Supply

Environmental Situation: The local water supply is non-functional; no water is available.

cause = THIRST	*n* = The affected neighborhood	*cov* = Coverage Fraction	
p = 0.1	*g* = The group that resolved the situation, if known	*state* = Situation state	
q = 0.0	*local.g* = Whether or not group *g* is local to the region		

Spawns: DISEASE after 2 days. **Auto-resolve after:** 3 days

Mitigated by: CMO_CONSTRUCTION, CMO_INDUSTRY, CMO_INFRASTRUCTURE, CMO_OTHER

Satisfaction Effects: All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov*.

1. Situation Inception	Effect	By	AUT	SFT	CUL	QOL
1.1: Water becomes unavailable New situation	LEVEL time		*cov* × M– 2 days			*cov* × XL– 2 days
2. Ongoing Effects						
2.1: Water continues to be unavailable *state* != ENDED	SLOPE Thresh		*cov* × L– -100, 100			*cov* × XXXL– -100, 100
2.2: Water is available *state* = ENDED	SLOPE		Terminate Slope Effects			
3: Situation Resolution						
3.1: Water supply is restored by outsiders *g* is unknown or *local.g* is false	LEVEL time	*g*	*cov* × XL+ 2 days			*cov* × XXXL+ 2 days
3.2: Water supply is restored by locals *g* is known and *local.g* is true.	LEVEL time	*g*	*cov* × XXL+ 2 days			*cov* × XXXL+ 2 days

Other Effects: None

ORDNANCE: Unexploded Ordnance

Environmental Situation: The civilians know that there is unexploded ordnance in the local area, probably from cluster munitions.						
cause = ORDNANCE *p* = 0.0 *q* = 0.0	*n* = The affected neighborhood *g* = The group that resolved the situation, if known *local.g* = Whether or not group *g* is local to the region			*cov* = Coverage Fraction *state* = Situation state		
Spawns: Nothing. **Auto-resolve after:** 540 days						
Mitigated by: CMO_CONSTRUCTION, CMO_OTHER						
Satisfaction Effects: All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov*.						
1. Situation Inception	**Effect**	**By**	**AUT**	**SFT**	**CUL**	**QOL**
1.1: Unexploded ordnance is found New situation	LEVEL time		*cov* × S– 2 days	*cov* × XXL– 2 days		*cov* × XL– 2 days
2. Ongoing Effects						
2.1: Unexploded ordnance remains *state* != ENDED	SLOPE Thresh		*cov* × L– -100, 100	*cov* × XXL– -100, 100		*cov* × XXL– -100, 100
2.2: Unexploded ordnance is gone *state* = ENDED	SLOPE		Terminate Slope Effects			
3: Situation Resolution						
3.1: Unexploded ordnance is removed by outsiders *g* is unknown or *local.g* is false	LEVEL time	*g*	*cov* × L+ 2 days	*cov* × XXXL+ 2 days		*cov* × XXXL+ 2 days
3.2: Unexploded ordnance is removed by locals *g* is known and *local.g* is true.	LEVEL time	*g*	*cov* × XL+ 2 days	*cov* × XXXL+ 2 days		*cov* × XXXL+ 2 days
Other Effects: None						

PIPELINE: Oil Pipeline Fire

Environmental Situation: Damage to an oil pipeline has caused it to catch fire.

cause	= PIPELINE	*n*	= The affected neighborhood	*cov*	= Coverage Fraction
p	= 0.0	*g*	= The group that resolved the situation, if known	*state*	= Situation state
q	= 0.0	*local.g*	= Whether or not group *g* is local to the region		

Spawns: Nothing. **Auto-resolve after:** 7 days

Mitigated by: CMO_CONSTRUCTION, CMO_INDUSTRY, CMO_OTHER

Satisfaction Effects: All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov*.

1. Situation Inception	Effect	By	AUT	SFT	CUL	QOL
1.1: Oil pipeline catches fire New situation	LEVEL time		*cov* × S– 2 days	*cov* × XXS– 2 days		*cov* × XL– 2 days
2. Ongoing Effects						
2.1: Oil pipeline is still burning *state* != ENDED	SLOPE Thresh		*cov* × M– -100, 100	*cov* × XXS– -100, 100		*cov* × XXL– -100, 100
2.2: Oil pipeline is no longer burning *state* = ENDED	SLOPE		Terminate Slope Effects			
3: Situation Resolution						
3.1: Oil pipeline fire is extinguished by outsiders *g* is unknown or *local.g* is false	LEVEL time	*g*	*cov* × L+ 2 days	*cov* × L+ 2 days		*cov* × XXXL+ 2 days
3.2: Oil pipeline fire is extinguished by locals *g* is known and *local.g* is true.	LEVEL time	*g*	*cov* × XL+ 2 days	*cov* × L+ 2 days		*cov* × XXXL+ 2 days

Other Effects: None

POWEROUT: Power Outage

Environmental Situation: Electrical power is off in the local area.						
cause = POWEROUT *p* = 0.1 *q* = 0.0	*n* = The affected neighborhood *g* = The group that resolved the situation, if known *local.g* = Whether or not group *g* is local to the region		*cov* = Coverage Fraction *state* = Situation state			
Spawns: Nothing. **Auto-resolve after:** 60 days						
Mitigated by: CMO_CONSTRUCTION, CMO_INDUSTRY, CMO_INFRASTRUCTURE, CMO_OTHER						
Satisfaction Effects: All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov*.						
1. Situation Inception	**Effect**	**By**	**AUT**	**SFT**	**CUL**	**QOL**
1.1: Power goes out New situation	LEVEL time		*cov* × S– 2 days	*cov* × S– 2 days		*cov* × M– 2 days
2. Ongoing Effects						
2.1: Power remains out *state* != ENDED	SLOPE Thresh		*cov* × M– -100, 100	*cov* × S– -100, 100		*cov* × L– -100, 100
2.2: Power is back on *state* = ENDED	SLOPE		Terminate Slope Effects			
3: Situation Resolution						
3.1: Power is restored by outsiders *g* is unknown or *local.g* is false	LEVEL time	*g*	*cov* × L+ 2 days	*cov* × L+ 2 days		*cov* × XL+ 2 days
3.2: Power is restored by locals *g* is known and *local.g* is true.	LEVEL time	*g*	*cov* × XXL+ 2 days	*cov* × L+ 2 days		*cov* × XL+ 2 days
Other Effects: None						

TBD: To assess economic impacts, we'll need to distinguish between intermittent power outages and total power outages.

REFINERY: Oil Refinery Fire

Environmental Situation: Damage to an oil refinery has caused it to catch fire.						
cause = REFINERY *p* = 0.0 *q* = 0.0	*n* = The affected neighborhood *g* = The group that resolved the situation, if known *local.g* = Whether or not group *g* is local to the region			*cov* = Coverage Fraction *state* = Situation state		
Spawns: Nothing **Auto-resolve after:** 5 days						
Mitigated by: CMO_CONSTRUCTION, CMO_INDUSTRY, CMO_OTHER						
Satisfaction Effects: All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov*.						
1. Situation Inception	**Effect**	**By**	**AUT**	**SFT**	**CUL**	**QOL**
1.1: Oil refinery catches fire New situation	LEVEL time		*cov* × M– 2 days	*cov* × S– 2 days		*cov* × XL– 2 days
2. Ongoing Effects						
2.1: Oil refinery is still burning *state* != ENDED	SLOPE Thresh		*cov* × L– -100, 100	*cov* × M–		*cov* × XXL–
2.2: Oil refinery is no longer burning *state* = ENDED	SLOPE		Terminate Slope Effects			
3: Situation Resolution						
3.1: Oil refinery fire is extinguished by outsiders *g* is unknown or *local.g* is false	LEVEL time	*g*	*cov* × XL+ 2 days	*cov* × XL+ 2 days		*cov* × XXL+ 2 days
3.2: Oil refinery fire is extinguished by locals *g* is known and *local.g* is true.	LEVEL time	*g*	*cov* × XXXL+ 2 days	*cov* × XL+ 2 days		*cov* × XXL+ 2 days
Other Effects: None						

RELSITE: Damage to Religious Site/Artifact

Environmental Situation: A significant religious site or artifact is damaged, presumably due to kinetic action involving a force group.

cause	= RELSITE	*n*	= The affected neighborhood	*cov*	= Coverage Fraction
p	= 0.1	*g*	= The group that resolved the situation, if known	*state*	= Situation state
q	= 0.1	*local.g*	= Whether or not group *g* is local to the region		

Spawns: Nothing **Auto-resolve after:** 45 days

Mitigated by: CMO_CONSTRUCTION, CMO_OTHER

Satisfaction Effects: All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov*.

1. Situation Inception	Effect	By	AUT	SFT	CUL	QOL
1.1: A religious site is damaged New situation	LEVEL time		*cov* × S– 2 days	*cov* × M– 2 days	*cov* × XL– 2 days	*cov* × M– 2 days
2. Ongoing Effects						
2.1: Damage has not been resolved *state* != ENDED	SLOPE Thresh		*cov* × S– -100, 100	*cov* × S– -100, 100	*cov* × XL– -100, 100	*cov* × XS– -100, 100
2.2: Damage is no longer causing resentment *state* = ENDED	SLOPE		Terminate Slope Effects			
3: Situation Resolution						
3.1: Damage is resolved by outsiders *g* is unknown or *local.g* is false	LEVEL time	*g*	*cov* × M+ 2 days	*cov* × XL+ 2 days	*cov* × M+ 2 days	*cov* × M+ 2 days
3.2: Damage is resolved by locals *g* is known and *local.g* is true.	LEVEL time	*g*	*cov* × XL+ 2 days	*cov* × XL+ 2 days	*cov* × M+ 2 days	*cov* × M+ 2 days

Other Effects: None

SEWAGE: Sewage Spill

Environmental Situation: Sewage is pooling in the streets.					
cause = SEWAGE *p* = 0.2 *q* = 0.0	*n* = The affected neighborhood *g* = The group that resolved the situation, if known *local.g* = Whether or not group *g* is local to the region		*cov* = Coverage Fraction *state* = Situation state		
Spawns: DISEASE after 30 days **Auto-resolve after:** 60 days					
Mitigated by: CMO_CONSTRUCTION, CMO_INFRASTRUCTURE, CMO_OTHER					
Satisfaction Effects: All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov*.					
1. Situation Inception	**Effect**	**By**	**AUT**	**SFT**	**CUL**	**QOL**
1.1: Sewage begins to accumulate New situation	LEVEL time		*cov* × S– 2 days			*cov* × L– 2 days
2. Ongoing Effects						
2.1: Sewage has pooled in the streets *state* != ENDED	SLOPE Thresh		*cov* × M– -100, 100			*cov* × XL– -100, 100
2.2: Sewage is no longer pooled in the streets *state* = ENDED	SLOPE		Terminate Slope Effects			
3: Situation Resolution						
3.1: Sewage is cleaned up by outsiders *g* is unknown or *local.g* is false	LEVEL time	*g*	*cov* × L+ 2 days			*cov* × XXL+ 2 days
3.2: Sewage is cleaned up by locals *g* is known and *local.g* is true.	LEVEL time	*g*	*cov* × XL+ 2 days			*cov* × XXL+ 2 days
Other Effects: None						

5. Activity Situations

Activity situations are circumstances driven by unit activities, rather than by environmental conditions. At present, there are two distinct kinds of activity situation in Athena:

- Force activity situations
- Organization activity situations
- Civilian activity situations

The details of each of these are discussed in the following sections.

5.1 Force Activities

Force Activities: A force group is said to be performing an activity in a neighborhood when one or more units belonging to the group are engaged in the activity. Activities may be explicit or abstract. The only explicit activity that is currently supported is PRESENCE, also referred to as "Mere Presence". All force units in a neighborhood are engaged in PRESENCE whether they wish to be or not. Abstract activities are assigned to units by the analyst; units are assumed to be engaged in their assigned activity unless prevented by some other circumstance. For example, a unit may be assigned to CMO_HEALTHCARE, but if it has insufficient security then its assignment to CMO_HEALTHCARE is said to be *ineffective*.

Nominal, Active, and Effective Personnel: The number of personnel in units assigned to an activity is called the *nominal personnel* for that activity. However, not all of the assigned personnel are necessarily active all of the time, depending on the schedule assumed for the activity. If GUARD is a 24x7 activity, then the nominal personnel are presumed to be working shifts; only one shift's personnel are actually active at any given time. This is controlled by the activity's *number of shifts*.[5] The nominal personnel are divided by this ratio to yield the *active personnel*. Finally, the active personnel might or might not be able to work effectively, due to external circumstances. This yields the *effective personnel* for the activity.

Coverage Fractions: Athena analyzes the situation in each neighborhood periodically and determines which units are effectively engaged in which activities. Then, it computes a *coverage fraction* for each possible force activity.[6] The coverage fraction ranges from 0.0, indicating that no unit is engaged in the activity, to 1.0, indicating that the activity is affecting the entire population of the neighborhood. The following parameters affect the computation of the coverage fraction:

- **Minimum Security:** If the force group's security in the neighborhood is less than the specified minimum, the coverage will be 0.0.

- **2/3rds Coverage:** This the number of personnel that must be effectively performing an activity before it affects 2/3rds of the population of the neighborhood. It is usually expressed as *x* personnel per 1000 population, e.g., 25 personnel per 1000 population. In some cases a different denominator is used; PSYOP reaches 2/3rds coverage at 1 person per 50,000 population.

Force Activity Situations: A force activity situation is created for a particular force group *g* in neighborhood *n* when the coverage fraction for activity *a* exceeds 0.0 for the first time, that is, when the actual personnel is greater than 0. The situation persists thereafter until no units of group *g* are attempting to engage in activity *a* in neighborhood *n*, that is, when the nominal personnel returns to 0. If a situation's coverage fraction is 0.0 it is said to be *inactive*; otherwise it is said to be *active*.

Rule Set Triggers: Each force activity situation triggers its related rule set once every tick. It is not the case that a rule fires every time the rule set is

[5] parmdb(5): `activity.FRC.activity.shifts`

[6] This is discussed in detail in the Athena Analyst's Guide.

triggered; rather, a rule that fires remains in effect until the situation changes significantly, at which time another rule will fire. The following mechanism is used to determine whether the situation has changed significantly:

- Every tick, the situation's rule set is triggered.
- Each rule has an associated value, the *signature*, which is computed when the rule's conditions are met. The signature consists of:
  - The name of the rule
  - Any inputs that significantly affect the outcome of the rule firing (if any), e.g., the coverage fraction.
- When the rule fires, this signature is saved.
- During the next tick, if the same rule's conditions are met, the rule will be prevented from firing unless its signature has changed.

We determine significant changes to the coverage fraction by rounding the coverage fraction to two decimal place; this is the form in which it appears in the governing rule's signature. Thus, if the coverage fraction changes from 0.10 to 0.20, rule 2.1 will fire and update the satisfaction effects accordingly.

Satisfaction and Cooperation Effects: The magnitude of the resulting changes are scaled by the coverage fraction, and in many cases by the relationship between the force group and the local civilian groups as mediated by a relationship multiplier function. However, the satisfaction change magnitudes specified herein assume a nominal coverage of 2/3rds and a nominal relationship of ±0.6.[7]

[7] parmdb(5): `dam.nominalCoverage` and `rmf.nominalRelationship.`

Rule Set Summary: Activity Parameters

Rule Set	Activity	Minimum Security	Shifts	2/3rds Coverage	Cause
CHKPOINT	CHECKPOINT	Low	1	25/1000	CHKPOINT
CMOCONST	CMO_CONSTRUCTION	High	1	20/1000	CMOCONST
CMODEV	CMO_DEVELOPMENT	Medium	1	25/1000	CMODEV
CMOEDU	CMO_EDUCATION	High	1	20/1000	CMOEDU
CMOEMP	CMO_EMPLOYMENT	High	1	20/1000	CMOEMP
CMOIND	CMO_INDUSTRY	High	1	20/1000	CMOIND
CMOINF	CMO_INFRASTRUCTURE	High	1	20/1000	CMOINF
CMOLAW	CMO_LAW_ENFORCEMENT	Medium	1	25/1000	CMOLAW
CMOMED	CMO_HEALTHCARE	High	1	20/1000	CMOMED
CMOOTHER	CMO_OTHER	High	1	20/1000	CMOOTHER
COERCION	COERCION	Medium	1	12/1000	COERCION
CRIMINAL	CRIMINAL_ACTIVITIES	Medium	1	10/1000	CRIMINAL
CURFEW	CURFEW	Medium	1	25/1000	CURFEW
GUARD	GUARD	Low	1	25/1000	GUARD
PATROL	PATROL	Low	1	25/1000	PATROL
PRESENCE	Mere Presence	None	1	25/1000	PRESENCE
PSYOP	PSYOP	Low	1	1/50000	PSYOP

Rule Set Summary: Satisfaction and Cooperation Effects

Rule Set	*p*	*q*		AUT	SFT	CUL	QOL	Coop	Note
CHKPOINT	0.25	0.00	*cov* ×	**quad** × S+	**quad** × S+	XXS–	XS–	**quad** × XXXS+	Friends
						S–	S–		Enemies
CMOCONST	0.75	0.25	*cov* ×	**quad** × S+	S+	XS+	L+	**frmore** × M+	
CMODEV	0.50	0.10	*cov* ×	**quad** × M+	**quad** × S+	**quad** × S+	**quad** × L+	**frmore** × M+	
CMOEDU	0.75	0.50	*cov* ×	**quad** × S+	XXS+	**quad** × XXS+	L+	**frmore** × M+	
CMOEMP	0.75	0.50	*cov* ×	**quad** × S+	XXS+	XXS+	L+	**frmore** × M+	
CMOIND	0.75	0.25	*cov* ×	**quad** × S+	XXS+	XXS+	L+	**frmore** × M+	
CMOINF	0.75	0.25	*cov* ×	**quad** × S+	XXS+	XXS+	M+	**frmore** × M+	
CMOLAW	0.50	0.25	*cov* ×	**quad** × M+	**quad** × S+			**quad** × M+	
CMOMED	0.75	0.25	*cov* ×	**quad** × S+	XXS+		L+	**frmore** × L+	
CMOOTHER	0.25	0.10	*cov* ×	**quad** × S+	S+	XS+	L+	**frmore** × M+	
COERCION	0.50	0.20	*cov* ×	**enquad** × XL–	**enquad** × XXL–	**enquad** × XS–	**enquad** × M–	**enmore** × XXXL+	
CRIMINAL	0.50	0.20	*cov* ×	**enquad** × L–	**enquad** × XL–		**enquad** × L–		
CURFEW	0.50	0.00	*cov* ×	S–	**quad** × S+	S–	S–	**quad** × M+	Friends
					quad × M+ [8]				Enemies
GUARD	0.50	0.00	*cov* ×	**enmore** × L–	**enmore** × L–	**enmore** × L–	**enmore** × M–	**quad** × S+	
PATROL	0.50	0.00	*cov* ×	**enmore** × M–	**enmore** × M–	**enmore** × S–	**enmore** × L–	**quad** × S+	
PRESENCE	0.25	0.00	*cov* ×	**quad** × XXS+	**quad** × XXS+		**quad** × XXS+	**quad** × XXS+	
PSYOP	0.10	0.00	*cov* ×	S+	S+	S+	S+	**frmore** × XL+	Friends
				XS+	XS+	XS+	XS+		Enemies
Modifiers	+1 stop if mitigating an environmental situation								

[8] Note that **quad** negates the sign here, since this is only for enemies. Thus, this is effectively an M–.

CHKPOINT: Checkpoint/Control Point

Force Activity Situation: Units belonging to a force group are operating checkpoints in a neighborhood.							
Abstract Activity: CHECKPOINT Minimum Security: Low Shifts: 1 2/3rds Coverage: 25 personnel per 1000 population		*cause* = CHKPOINT *p* = 0.25 *q* = 0.0		*n* = The affected neighborhood *g* = The force group conducting the activity *cov* = Coverage, fraction of *n* affected *rel.nfg* = Group *f*'s relationship with *g* in *n*.			
Mitigates: None.							
Affects All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov* and *rel.nfg*.							
1. Situation Is Active	**Effect**	**By**	**AUT**	**SFT**	**CUL**	**QOL**	**Coop**
1.1: Force units assigned CHECKPOINT activity. *cov* > 0.0	SLOPE	*g*	*cov* × **quad** S+	*cov* × **quad** S+			*cov* × **quad** XXXS+
f* is a friend of *g *rel.nfg* ≥ 0.0	SLOPE	*g*			*cov* × XXS–	*cov* × XS–	
f* is an enemy of *g *rel.nfg* < 0.0	SLOPE	*g*			*cov* × S–	*cov* × S–	
2: Situation is Inactive							
2.1: Force units no longer operating checkpoints. *cov* = 0.0	SLOPE		Terminate slope effects				
Other Effects: None							

CMOCONST: CMO — Construction, by Force Group

Force Activity Situation: Units belonging to a FRC group are doing construction work in the neighborhood.							
Abstract Activity: CMO_CONSTRUCTION Minimum Security: High Shifts: 1 2/3rds Coverage: 20 personnel per 1000 population		*cause* = CMOCONST *p* = 0.75 *q* = 0.25		*n* = The affected neighborhood *g* = The force group conducting the activity *cov* = Coverage, fraction of *n* affected *rel.nfg* = Group *f*'s relationship with *g* in *n*.			
Mitigates: BADFOOD, BADWATER, COMMOUT, CULSITE, DISASTER, DISEASE, EPIDEMIC, FOODSHRT, FUELSHRT, GARBAGE, INDSPILL, MINEFIELD, NOWATER, ORDNANCE, PIPELINE, POWEROUT, REFINERY, RELSITE, SEWAGE							
Affects All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov* and *rel.nfg*.							
1. Situation Is Active	**Effect**	**By**	**AUT**	**SFT**	**CUL**	**QOL**	**Coop**
1.1: FRC units are doing construction work *cov* > 0.0	SLOPE	*g*	*cov* × **quad** S+	*cov* × S+	*cov* × **quad** XS+	*cov* × L+	*cov* × **frmore** M+
Mitigates abstract situation in *n*			+1 stop				
2: Situation is Inactive							
2.1: FRC units no longer doing construction work *cov* = 0.0	SLOPE		Terminate slope effects				
Other Effects: None							

CMODEV: CMO — Development (Light), by Force Group

Force Activity Situation: Units belonging to a force group are encouraging light development.							
Abstract Activity: CMO_DEVELOPMENT Minimum Security: Medium Shifts: 1 2/3rds Coverage: 25 personnel per 1000 population		*cause* = CMODEV *p* = 0.5 *q* = 0.1		*n* = The affected neighborhood *g* = The force group conducting the activity *cov* = Coverage, fraction of *n* affected *rel.nfg* = Group *f*'s relationship with *g* in *n*.			
Mitigates: None.							
Affects All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov* and *rel.nfg*.							
1. Situation Is Active	**Effect**	**By**	**AUT**	**SFT**	**CUL**	**QOL**	**Coop**
1.1: Force units are encouraging light development *cov* > 0.0	SLOPE	*g*	*cov* × **quad** × M+	*cov* × **quad** × S+	*cov* × **quad** × S+	*cov* × **quad** × L+	*cov* × **frmore** × M+
2: Situation is Inactive							
2.1: Force units no longer encouraging light development *cov* = 0.0	SLOPE		Terminate slope effects				
Other Effects: None							

CMOEDU: CMO — Education, by Force Group

Force Activity Situation: Units belonging to a FRC group are teaching local civilians							
Abstract Activity: CMO_EDUCATION Minimum Security: High Shifts: 1 2/3rds Coverage: 20 personnel per 1000 population		*cause* = CMOEDU *p* = 0.75 *q* = 0.5		*n* = The affected neighborhood *g* = The force group conducting the activity *cov* = Coverage, fraction of *n* affected *rel.nfg* = Group *f*'s relationship with *g* in *n*.			
Mitigates: None.							
Affects All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov* and *rel.nfg*.							
1. Situation Is Active	**Effect**	**By**	**AUT**	**SFT**	**CUL**	**QOL**	**Coop**
1.1: FRC units are teaching local civilians *cov* > 0.0	SLOPE	*g*	*cov* × **quad** S+	*cov* × XXS+	*cov* × **quad** XXS+	*cov* × L+	*cov* × **frmore** M+
2: Situation is Inactive							
2.1: FRC units no longer teaching local civilians *cov* = 0.0	SLOPE		Terminate slope effects				
Other Effects: None							

CMOEMP: CMO — Employment, by Force Group

Force Activity Situation: Units belonging to a FRC group are employing local civilians							
Abstract Activity: CMO_EMPLOYMENT Minimum Security: High Shifts: 1 2/3rds Coverage: 20 personnel per 1000 population		*cause* = CMOEMP *p* = 0.75 *q* = 0.5		*n* = The affected neighborhood *g* = The force group conducting the activity *cov* = Coverage, fraction of *n* affected *rel.nfg* = Group *f*'s relationship with *g* in *n*.			
Mitigates: None.							
Affects All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov* and *rel.nfg*.							
1. Situation Is Active	**Effect**	**By**	**AUT**	**SFT**	**CUL**	**QOL**	**Coop**
1.1: FRC units are providing employment *cov* > 0.0	SLOPE	*g*	*cov* × **quad** S+	*cov* × XXS+	*cov* × XXS+	*cov* × L+	*cov* × **frmore** M+
2: Situation is Inactive							
2.1: FRC units no longer providing employment *cov* = 0.0	SLOPE		Terminate slope effects				
Other Effects: None							

CMOIND: CMO — Industry, by Force Group

Force Activity Situation: Units belonging to a FRC group are aiding local industry							
Abstract Activity: CMO_INDUSTRY Minimum Security: High Shifts: 1 2/3rds Coverage: 20 personnel per 1000 population		*cause* = CMOIND *p* = 0.75 *q* = 0.25		*n* = The affected neighborhood *g* = The force group conducting the activity *cov* = Coverage, fraction of *n* affected *rel.nfg* = Group *f*'s relationship with *g* in *n*.			
Mitigates: COMMOUT, FOODSHRT, FUELSHRT, INDSPILL, NOWATER, PIPELINE, POWEROUT, REFINERY							
Affects All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov* and *rel.nfg*.							
1. Situation Is Active	**Effect**	**By**	**AUT**	**SFT**	**CUL**	**QOL**	**Coop**
1.1: FRC units are aiding industry *cov* > 0.0	SLOPE	*g*	*cov* × **quad** S+	*cov* × XXS+	*cov* × XXS+	*cov* × L+	*cov* × **frmore** M+
Mitigates abstract situation in *n*			+1 stop				
2: Situation is Inactive							
2.1: FRC units no longer aiding industry *cov* = 0.0	SLOPE		Terminate slope effects				
Other Effects: None							

CMOINF: CMO — Infrastructure, by Force Group

Force Activity Situation: Units belonging to a FRC group are aiding local industry							
Abstract Activity: CMO_INFRASTRUCTURE Minimum Security: High Shifts: 1 2/3rds Coverage: 20 personnel per 1000 population		*cause* = CMOINF *p* = 0.75 *q* = 0.25		*n* = The affected neighborhood *g* = The force group conducting the activity *cov* = Coverage, fraction of *n* affected *rel.nfg* = Group *f*'s relationship with *g* in *n*.			
Mitigates: BADWATER, COMMOUT, NOWATER, POWEROUT, SEWAGE							
Affects All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov* and *rel.nfg*.							
1. Situation Is Active	**Effect**	**By**	**AUT**	**SFT**	**CUL**	**QOL**	**Coop**
1.1: FRC units are improving infrastructure *cov* > 0.0	SLOPE	*g*	*cov* × **quad** S+	*cov* × XXS+	*cov* × XXS+	*cov* × M+	*cov* × **frmore** M+
Mitigates abstract situation in *n*			+1 stop				
2: Situation is Inactive							
2.1: FRC units no longer improving infrastructure *cov* = 0.0	SLOPE		Terminate slope effects				
Other Effects: None							

CMOLAW: CMO — Law Enforcement, by Force Group

Force Activity Situation: Units belonging to a force group are enforcing the law in a neighborhood.							
Abstract Activity: CMO_LAW_ENFORCEMENT Minimum Security: Medium Shifts: 1 2/3rds Coverage: 25 personnel per 1000 population		*cause* = CMOLAW *p* = 0.5 *q* = 0.25		*n* = The affected neighborhood *g* = The force group conducting the activity *cov* = Coverage, fraction of *n* affected *rel.nfg* = Group *f*'s relationship with *g* in *n*.			
Mitigates: None.							
Affects All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov* and *rel.nfg*.							
1. Situation Is Active	**Effect**	**By**	**AUT**	**SFT**	**CUL**	**QOL**	**Coop**
1.1: Force units are enforcing the law *cov* > 0.0	SLOPE	*g*	*cov* × **quad** × M+	*cov* × **quad** × S+			*cov* × **quad** × M+
2: Situation is Inactive							
2.1: Force units no longer enforcing the law *cov* = 0.0	SLOPE		Terminate slope effects				
Other Effects: None							

CMOMED: CMO — Health Care, by Force Group

Force Activity Situation: Units belonging to a FRC group are providing health care to local civilians							
Abstract Activity: CMO_HEALTHCARE Minimum Security: High Shifts: 1 2/3rds Coverage: 20 personnel per 1000 population		*cause* = CMOMED *p* = 0.75 *q* = 0.25		*n* = The affected neighborhood *g* = The force group conducting the activity *cov* = Coverage, fraction of *n* affected *rel.nfg* = Group *f*'s relationship with *g* in *n*.			
Mitigates: DISEASE, EPIDEMIC							
Affects All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov* and *rel.nfg*.							
1. Situation Is Active	**Effect**	**By**	**AUT**	**SFT**	**CUL**	**QOL**	**Coop**
1.1: FRC units are providing health care *cov* > 0.0	SLOPE	*g*	*cov* × **quad** S+	*cov* × XXS+		*cov* × L+	*cov* × **frmore** L+
Mitigates abstract situation in *n*			+1 stop				
2: Situation is Inactive							
2.1: FRC units no longer providing health care *cov* = 0.0	SLOPE		Terminate slope effects				
Other Effects: None							

CMOOTHER: CMO — Other, by Force Group

Force Activity Situation: Units belonging to a FRC group are doing other CMO activities in the neighborhood							
Abstract Activity: CMO_OTHER Minimum Security: High Shifts: 1 2/3rds Coverage: 20 personnel per 1000 population		*cause* = CMOOTHER *p* = 0.25 *q* = 0.1		*n* = The affected neighborhood *g* = The force group conducting the activity *cov* = Coverage, fraction of *n* affected *rel.nfg* = Group *f*'s relationship with *g* in *n*.			
Mitigates: BADFOOD, BADWATER, COMMOUT, DISASTER, DISEASE, CULSITE, EPIDEMIC, FOODSHRT, FUELSHRT, GARBAGE, INDSPILL, MINEFIELD, NOWATER, ORDNANCE, PIPELINE, POWEROUT, REFINERY, RELSITE, SEWAGE							
Affects All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov* and *rel.nfg*.							
1. Situation Is Active	**Effect**	**By**	**AUT**	**SFT**	**CUL**	**QOL**	**Coop**
1.1: FRC units are doing other CMO activities *cov* > 0.0	SLOPE	*g*	*cov* × **quad** S+	*cov* × S+	*cov* × XS+	*cov* × L+	*cov* × **frmore** M+
Mitigates abstract situation in *n*			+1 stop				
2: Situation is Inactive							
2.1: FRC units no longer doing other CMO activities *cov* = 0.0	SLOPE		Terminate slope effects				
Other Effects: None							

COERCION: Coercion

Force Activity Situation: Units belonging to a force group are coercing residents of a neighborhood to cooperate with them through threats of violence.							
Abstract Activity: COERCION Minimum Security: Medium Shifts: 1 2/3rds Coverage: 12 personnel per 1000 population		*cause* = COERCION *p* = 0.5 *q* = 0.2		*n* = The affected neighborhood *g* = The force group conducting the activity *cov* = Coverage, fraction of *n* affected *rel.nfg* = Group *f*'s relationship with *g* in *n*.			
Mitigates: None.							
Affects All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov* and *rel.nfg*.							
1. Situation Is Active	**Effect**	**By**	**AUT**	**SFT**	**CUL**	**QOL**	**Coop**
1.1: Force units coercing local civilians *cov* > 0.0	SLOPE	*g*	*cov* × **enquad** XL–	*cov* × **enquad** XXL–	*cov* × **enquad** XS–	*cov* × **enquad** M–	*cov* × **enmore** XXXL+
2: Situation is Inactive							
2.1: Force units no longer coercing local civilians *cov* = 0.0	SLOPE		Terminate slope effects				
Other Effects: None							

CRIMINAL: Criminal Activities

Force Activity Situation: Units belonging to a force group are engaging in criminal activities in a neighborhood. Only enemies of the group are affected.		
Abstract Activity: CRIMINAL_ACTIVITIES Minimum Security: Medium Shifts: 1 2/3rds Coverage: 10 personnel per 1000 population	*cause* = CRIMINAL *p* = 0.5 *q* = 0.2	*n* = The affected neighborhood *g* = The force group conducting the activity *cov* = Coverage, fraction of *n* affected *rel.nfg* = Group *f*'s relationship with *g* in *n*.
Mitigates: None.		

Affects All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov* and *rel.nfg*.

1. Situation Is Active	**Effect**	**By**	**AUT**	**SFT**	**CUL**	**QOL**	**Coop**
1.1: Force units engaging in criminal activities *cov* > 0.0	SLOPE	*g*	*cov* × **enquad** × L–	*cov* × **enquad** × XL–		*cov* × **enquad** × L–	
2: Situation is Inactive							
2.1: Force units no longer engaging in criminal activities *cov* = 0.0	SLOPE		Terminate slope effects				
Other Effects: None							

CURFEW: Curfew

Force Activity Situation: Units belonging to a force group are enforcing a curfew in a neighborhood.							
Abstract Activity: CURFEW Minimum Security: Medium Shifts: 1 2/3rds Coverage: 25 personnel per 1000 population		*cause* = CURFEW *p* = 0.5 *q* = 0.0		*n* = The affected neighborhood *g* = The force group conducting the activity *cov* = Coverage, fraction of *n* affected *rel.nfg* = Group *f*'s relationship with *g* in *n*.			
Mitigates: None.							
Affects All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov* and *rel.nfg*.							
1. Situation Is Active	**Effect**	**By**	**AUT**	**SFT**	**CUL**	**QOL**	**Coop**
1.1: Force units enforcing curfew *cov* > 0.0	SLOPE	*g*	*cov* × S–		*cov* × S–	*cov* × S–	*cov* × **quad** M+
f* is a friend of *g *rel.nfg* ≥ 0.0	SLOPE	*g*		*cov* × **frquad** S+			
f* is an enemy of *g *rel.nfg* < 0.0	SLOPE	*g*		*cov* × **enquad** M–			
2: Situation is Inactive							
2.1: Force units no longer enforcing curfew *cov* = 0.0	SLOPE		Terminate slope effects				
Other Effects: None							

GUARD: Guard

Force Activity Situation: Units belonging to a force group are guarding sites in a neighborhood.							
Abstract Activity: GUARD Minimum Security: Low Shifts: 1 2/3rds Coverage: 25 personnel per 1000 population		*cause* = GUARD *p* = 0.5 *q* = 0.0		*n* = The affected neighborhood *g* = The force group conducting the activity *cov* = Coverage, fraction of *n* affected *rel.nfg* = Group *f*'s relationship with *g* in *n*.			
Mitigates: None.							
Affects All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov* and *rel.nfg*.							
1. Situation Is Active	**Effect**	**By**	**AUT**	**SFT**	**CUL**	**QOL**	**Coop**
1.1: Force units guarding *cov* > 0.0	SLOPE	*g*	*cov* × **enmore** L–	*cov* × **enmore** L–	*cov* × **enmore** L–	*cov* × **enmore** M–	*cov* × **quad** S+
2: Situation is Inactive							
2.1: Force units no longer guarding *cov* = 0.0	SLOPE		Terminate slope effects				
Other Effects: None							

PATROL: Patrol

Force Activity Situation: Units belonging to a force group are patrolling a neighborhood.			
Abstract Activity: PATROL	*cause* = PATROL	*n* = The affected neighborhood	
Minimum Security: Low	*p* = 0.5	*g* = The force group conducting the activity	
Shifts: 1	*q* = 0.0	*cov* = Coverage, fraction of *n* affected	
2/3rds Coverage: 25 personnel per 1000 population		*rel.nfg* = Group *f*'s relationship with *g* in *n*.	
Mitigates: None.			
Affects All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov* and *rel.nfg*.			

1. Situation Is Active	**Effect**	**By**	**AUT**	**SFT**	**CUL**	**QOL**	**Coop**
1.1: Force units patrolling *cov* > 0.0	SLOPE	*g*	*cov* × **enmore** M–	*cov* × **enmore** M–	*cov* × **enmore** S–	*cov* × **enmore** L–	*cov* × **quad** S+
2: Situation is Inactive							
2.1: Force units no longer patrolling *cov* = 0.0	SLOPE		Terminate slope effects				
Other Effects: None							

PRESENCE: Mere Presence of Force Units

Force Activity Situation: Units belonging to a force group are present in a neighborhood.[9]		
Explicit Activity: Mere Presence 2/3rds Coverage: 25 personnel per 1000 population	*cause* = PRESENCE *p* = 0.25 *q* = 0.0	*n* = The affected neighborhood *g* = The force group conducting the activity *cov* = Coverage, fraction of *n* affected *rel.nfg* = Group *f*'s relationship with *g* in *n*.

Mitigates: None.

Affects: All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov* and *rel.nfg*.

1. Situation Is Active	**Effect**	**By**	**AUT**	**SFT**	**CUL**	**QOL**	**Coop**
1.1: Presence of force units *cov* > 0.0	SLOPE	*g*	*cov* × **quad** XXS+	*cov* × **quad** XXS+		*cov* × **quad** XXS+	*cov* × **quad** XXS+
2: Situation is Inactive							
2.1: Force units no longer present *cov* = 0.0	SLOPE		Terminate slope effects				

Other Effects: None

[9] Note: a force unit's presence always affects the neighborhood, whether it is engaged in other activities or not.

PSYOP: Psychological Operations

Force Activity Situation: Units belonging to a force group are doing PSYOP in a neighborhood.							
Abstract Activity: PSYOP Minimum Security: Low Shifts: 1 2/3rds Coverage: 1 personnel per 50,000 population		*cause* = PSYOP *p* = 0.1 *q* = 0.0		*n* = The affected neighborhood *g* = The force group conducting the activity *cov* = Coverage, fraction of *n* affected *rel.nfg* = Group *f*'s relationship with *g* in *n*.			
Mitigates: Nothing							
Satisfaction Effects: All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov* and *rel.nfg*.							
1. Situation Is Active	**Effect**	**By**	**AUT**	**SFT**	**CUL**	**QOL**	**Coop**
1.1: Force units doing PSYOP *cov* > 0.0	SLOPE	*g*					*cov* × **frmore** XL+
f* is a friend of *g *rel.nfg* ≥ 0.0	SLOPE	*g*	*cov* × S+	*cov* × S+	*cov* × S+	*cov* × S+	
f* is an enemy of *g *rel.nfg* < 0.0	SLOPE	*g*	*cov* × XS+	*cov* × XS+	*cov* × XS+	*cov* × XS+	
2: Situation is Inactive							
2.1: Force units no longer doing PSYOP *cov* = 0.0	SLOPE		Terminate slope effects				
Other Effects: None							

5.2 Organization Activities

Organization Activities: An organization group is said to be performing an activity in a neighborhood when one or more units belonging to the group are engaged in the activity. All organization activities are assigned to units by a human controller; units are assumed to be engaged in their assigned activity unless prevented by some other circumstance. For example, a unit may be assigned to CMO_HEALTHCARE, but if it has insufficient security then its assignment to CMO_HEALTHCARE is said to be *ineffective*.

TBD: There might be other reasons why a unit's assignment might be ineffective. At present, though, security is it.

Organization activities are modeled similarly to force activities; see Section 5.1 for details. The differences are as follows:

- The minimum security level required for an organization group to do an activity depends on the organization's type, NGO, IGO, or CTR.
- The relationship between the organization group and the local civilians is assumed to be irrelevant, so relationship multiplier functions are not used.
- If the organization group is **dissatisfied** with its Casualties (CAS) satisfaction, it does not work as efficiently, and all satisfaction changes are reduced by one stop.
- An organization group may be *inactive* in a particular neighborhood, or in the playbox as a whole; if it is inactive in a neighborhood, then units of the group working in that neighborhood have no satisfaction effects. The group's activity or inactivity are determined by Athena's JOUT rules; in general, a group will be inactive if it is **very dissatisfied** with CAS. TBD: This bullet describes JNEM; this mechanism does not yet exist in Athena.

NOTE: In JNEM, an organization group's "Service" satisfaction (SVC) increases when the group is working. This serves only as feedback to the commander that the group is happy, and it's information that's available in other ways (i.e., through the presence of activity situations. Consequently, Athena doesn't currently model SVC.

Rule Set Summary: Activity Parameters

Rule Set	Abstract Activity	2/3rds Coverage	Shifts	Minimum Security			Cause
				NGO	IGO	CTR	
ORGCONST	CMO_CONSTRUCTION	20/1000	1	High	High	Medium	ORGCONST
ORGEDU	CMO_EDUCATION	20/1000	1	High	High	Medium	ORGEDU
ORGEMP	CMO_EMPLOYMENT	20/1000	1	High	High	Medium	ORGEMP
ORGIND	CMO_INDUSTRY	20/1000	1	High	High	Medium	ORGIND
ORGINF	CMO_INFRASTRUCTURE	20/1000	1	High	High	Medium	ORGINF
ORGMED	CMO_HEALTHCARE	20/1000	1	High	High	Medium	ORGMED
ORGOTHER	CMO_OTHER	20/1000	1	High	High	Medium	ORGOTHER

Rule Set Summary: Satisfaction Effects

Rule Set	Civilian Effects					
	p	*q*	AUT	SFT	CUL	QOL
ORGCONST	0.75	0.25	*cov* × S+	*cov* × S+	*cov* × XS+	*cov* × L+
ORGEDU	0.75	0.5	*cov* × S+	*cov* × XXS+	*cov* × XXS+	*cov* × L+
ORGEMP	0.75	0.5	*cov* × S+	*cov* × XXS+	*cov* × XXS+	*cov* × L+
ORGIND	0.75	0.25	*cov* × S+	*cov* × XXS+	*cov* × XXS+	*cov* × L+
ORGINF	0.75	0.25	*cov* × S+	*cov* × XXS+	*cov* × XXS+	*cov* × M+
ORGMED	0.75	0.25	*cov* × S+	*cov* × XXS+	*cov* × XXS+	*cov* × L+
ORGOTHER	0.25	0.1	*cov* × S+	*cov* × S+	*cov* × XS+	*cov* × L+
Modifiers	+1 stop if mitigates abstract situation					

ORGCONST: CMO — Construction, by Organization Group

Organization Activity Situation: Units belonging to an ORG group are doing construction work in the neighborhood.		
Abstract Activity: CMO_CONSTRUCTION Min. Security: NGO: High, IGO: High, CTR: Medium Shifts: 1 2/3rds Coverage: 20 personnel per 1000 population	*cause* = ORGCONST *p* = 0.75 *q* = 0.25	*n* = The affected neighborhood *g* = The ORG group conducting the activity *cov* = Coverage, fraction of *n* affected
Mitigates: BADFOOD, BADWATER, COMMOUT, CULSITE, DISASTER, DISEASE, EPIDEMIC, FOODSHRT, FUELSHRT, GARBAGE, INDSPILL, MINEFIELD, NOWATER, ORDNANCE, PIPELINE, POWEROUT, REFINERY, RELSITE, SEWAGE		

Satisfaction Effects: All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov*.

1. Situation Is Active						
1.1: ORG units are doing construction work *cov* > 0.0	**Effect** SLOPE	**By** *g*	**AUT** *cov* × S+	**SFT** *cov* × S+	**CUL** *cov* × XS+	**QOL** *cov* × L+
Mitigates abstract situation in *n*			+1 stop			
2: Situation is Inactive						
2.1: ORG units no longer doing construction work *cov* = 0.0	SLOPE		Terminate slope effects			

Other Effects: None

ORGEDU: CMO — Education, by Organization Group

Organization Activity Situation: Units belonging to an ORG group are teaching local civilians.		
Abstract Activity: CMO_EDUCATION Min. Security: NGO: High, IGO: High, CTR: Medium Shifts: 1 2/3rds Coverage: 20 personnel per 1000 population	*cause* = ORGEDU *p* = 0.75 *q* = 0.5	*n* = The affected neighborhood *g* = The ORG group conducting the activity *cov* = Coverage, fraction of *n* affected
Mitigates: None		
Satisfaction Effects: All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov*.		

1. Situation Is Active						
1.1: ORG units are teaching local civilians *cov* > 0.0	**Effect**	**By**	**AUT**	**SFT**	**CUL**	**QOL**
	SLOPE	*g*	*cov* × S+	*cov* × XXS+	*cov* × XXS+	*cov* × L+
2: Situation is Inactive						
2.1: ORG units no longer teaching local civilians *cov* = 0.0	SLOPE		Terminate slope effects			
Other Effects: None						

ORGEMP: CMO — Employment, by Organization Group

Organization Activity Situation: Units belonging to an ORG group are employing local civilians.		
Abstract Activity: CMO_EMPLOYMENT Min. Security: NGO: High, IGO: High, CTR: Medium Shifts: 1 2/3rds Coverage: 20 personnel per 1000 population	*cause* = ORGEMP *p* = 0.75 *q* = 0.5	*n* = The affected neighborhood *g* = The ORG group conducting the activity *cov* = Coverage, fraction of *n* affected
Mitigates: None		
Satisfaction Effects: All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov*.		

1. Situation Is Active						
1.1: ORG units are providing employment *cov* > 0.0	**Effect**	**By**	**AUT**	**SFT**	**CUL**	**QOL**
	SLOPE	*g*	*cov* × S+	*cov* × XXS+	*cov* × XXS+	*cov* × L+
2: Situation is Inactive						
2.1: ORG units no longer providing employment *cov* = 0.0	SLOPE		Terminate slope effects			
Other Effects: None						

ORGIND: CMO — Industry, by Organization Group

Organization Activity Situation: Units belonging to an ORG group are aiding local industry.		
Abstract Activity: CMO_INDUSTRY Min. Security: NGO: High, IGO: High, CTR: Medium Shifts: 1 2/3rds Coverage: 20 personnel per 1000 population	*cause* = ORGIND *p* = 0.75 *q* = 0.25	*n* = The affected neighborhood *g* = The ORG group conducting the activity *cov* = Coverage, fraction of *n* affected
Mitigates: COMMOUT, FOODSHRT, FUELSHRT, INDSPILL, NOWATER, PIPELINE, POWEROUT, REFINERY		
Satisfaction Effects: All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov*.		

1. Situation Is Active						
1.1: ORG units are aiding industry *cov* > 0.0	**Effect**	**By**	**AUT**	**SFT**	**CUL**	**QOL**
	SLOPE	*g*	*cov* × S+	*cov* × XXS+	*cov* × XXS+	*cov* × L+
Mitigates abstract situation in *n*			+1 stop			
2: Situation is Inactive						
2.1: ORG units no longer aiding industry *cov* = 0.0	SLOPE		Terminate slope effects			
Other Effects: None						

ORGINF: CMO — Infrastructure, by Organization Group

Organization Activity Situation: Units belonging to an ORG group are improving local infrastructure.						
Abstract Activity: CMO_INFRASTRUCTURE Min. Security: NGO: High, IGO: High, CTR: Medium Shifts: 1 2/3rds Coverage: 20 personnel per 1000 population		*cause* = ORGINF *p* = 0.75 *q* = 0.25		*n* = The affected neighborhood *g* = The ORG group conducting the activity *cov* = Coverage, fraction of *n* affected		
Mitigates: BADWATER, COMMOUT, NOWATER, POWEROUT, SEWAGE						
Satisfaction Effects: All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov*.						
1. Situation Is Active						
1.1: ORG units are improving infrastructure *cov* > 0.0	**Effect**	**By**	**AUT**	**SFT**	**CUL**	**QOL**
	SLOPE	*g*	*cov* × S+	*cov* × XXS+	*cov* × XXS+	*cov* × M+
Mitigates abstract situation in *n*			+1 stop			
2: Situation is Inactive						
2.1: ORG units no longer improving infrastructure *cov* = 0.0	SLOPE		Terminate slope effects			
Other Effects: None						

ORGMED: CMO — Health care, by Organization Group

Organization Activity Situation: Units belonging to an ORG group are providing health care to local civilians.						
Abstract Activity: CMO_HEALTHCARE Min. Security: NGO: High, IGO: High, CTR: Medium Shifts: 1 2/3rds Coverage: 20 personnel per 1000 population	*cause* = ORGMED *p* = 0.75 *q* = 0.25		*n* = The affected neighborhood *g* = The ORG group conducting the activity *cov* = Coverage, fraction of *n* affected			
Mitigates: DISASTER, DISEASE, EPIDEMIC						
Satisfaction Effects: Organization group *g*, All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov*.						
1. Situation Is Active						
1.1: ORG units are providing health care *cov* > 0.0	**Effect**	**By**	**AUT**	**SFT**	**CUL**	**QOL**
	SLOPE	*g*	*cov* × S+	*cov* × XXS+	*cov* × XXS+	*cov* × L+
Mitigates abstract situation in *n*			+1 stop			
2: Situation is Inactive						
2.1: ORG units no longer providing health care *cov* = 0.0	SLOPE		Terminate slope effects			
Other Effects: None						

ORGOTHER: CMO — Other, by Organization Group

Organization Activity Situation: Units belonging to an ORG group are doing other CMO activities in the neighborhood.		
Abstract Activity: CMO_OTHER Min. Security: NGO: High, IGO: High, CTR: Medium Shifts: 1 2/3rds Coverage: 20 personnel per 1000 population	*cause* = ORGOTHER *p* = 0.25 *q* = 0.1	*n* = The affected neighborhood *g* = The ORG group conducting the activity *cov* = Coverage, fraction of *n* affected
Mitigates: BADFOOD, BADWATER, COMMOUT, CULSITE, DISASTER, DISEASE, EPIDEMIC, FOODSHRT, FUELSHRT, GARBAGE, INDSPILL, MINEFIELD, NOWATER, ORDNANCE, PIPELINE, POWEROUT, REFINERY, RELSITE, SEWAGE		

Satisfaction Effects: All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov*.

1. Situation Is Active						
1.1: ORG units are doing other CMO activities *cov* > 0.0	**Effect** SLOPE	**By** *g*	**AUT** *cov* × S+	**SFT** *cov* × S+	**CUL** *cov* × XS+	**QOL** *cov* × L+
Mitigates abstract situation in *n*			+1 stop			
2: Situation is Inactive						
2.1: ORG units no longer doing other CMO activities *cov* = 0.0	SLOPE		Terminate slope effects			
Other Effects: None						

5.3 Civilian Activities

Civilian Activities: A civilian group is said to be performing an activity in a neighborhood when one or more units belonging to the group are engaged in the activity. All civilian activities are (at present) assigned to units by a human controller; units are assumed to be engaged in their assigned activity unless prevented by some other circumstance. For example, if a unit has insufficient security to perform an activity then its assignment to that activity is said to be *ineffective*. However, the civilian activities currently defined have a security requirement of NONE.

Civilian activities are modeled similarly to force activities; see Section 5.1 for details. The differences are as follows:

- Security requirements are typically set to NONE.
- Each activity has only one shift. Displaced persons are displaced twenty-four hours a day.
- A wider range of coverage functions might be used.

Rule Set Summary: Activity Parameters

Rule Set	Abstract Activity	2/3rds Coverage	Shifts	Minimum Security	Cause
DISPLACED	DISPLACED	25/1000?	1	None	DISPLACED

Rule Set Summary: Satisfaction Effects

	Civilian Effects					
Rule Set	***p***	***q***	**AUT**	**SFT**	**CUL**	**QOL**
DISPLACED	?	?	*cov* × ?	*cov* × ?	*cov* × ?	*cov* × ?

DISPLACED: Displaced Persons/Refugees

Civilian Activity Situation: Units belonging to a neighborhood group are displaced persons/refugees in some neighborhood.						
Abstract Activity: DISPLACED Min. Security: None Shifts: 1 2/3rds Coverage: 25/1000		*cause* = DISPLACED *p* = 0.25 *q* = 0.0		*n* = The affected neighborhood *g* = The CIV group conducting the activity *cov* = Coverage, fraction of *n* affected *rel.nfg* = Group f's relationship with g in n.		
Satisfaction Effects: All civilian groups *f* with non-zero population in *n*. Magnitudes are for nominal *cov*.						
1. Situation Is Active						
1.1: Displaced persons living in neighborhood *cov* > 0.0	**Effect**	**By**	**AUT**	**SFT**	**CUL**	**QOL**
	SLOPE	*g*	*cov* × **enmore** × S–	*cov* × **enmore** × L–	*cov* × **enquad** × S–	*cov* × M–
2: Situation is Inactive						
2.1: Displaced persons no longer living in neighborhood *cov* = 0.0	SLOPE		Terminate slope effects			
Other Effects: None						

6. Demographic Situations

Demographic situations are circumstances driven by neighborhood group demographics, rather than by unit activities or environmental conditions. At present, there is only one demographic situation in Athena, the neighborhood group's response to significant unemployment.

Neighborhood Factors vs. Neighborhood Group Factors: Just as activity situations are driven by coverage fractions, demographic situations are driven by neighborhood and neighborhood group factors related to some circumstance: the *nfactor* and the *ngfactor*. Each of these factors is a multiplier used to modify the magnitudes in the situation's rule set. The reason for the two factors is that a demographic situation can affect a neighborhood group in two ways. In the case of unemployment, for example, the quality-of-life of a group is affected when its own people are without work; but its safety is affected when there are large numbers of unemployed workers wandering about, regardless of which group they are from. Thus, the *ngfactor* shows the magnitude of the problem with respect to the neighborhood group itself, and the *nfactor* shows the magnitude of the problem in the neighborhood as a whole.

Rule Set Triggers: Each demographic situation triggers its related rule set once every tick, if either factor has changed. It is not the case that a rule fires every time the rule set is triggered; rather, a rule that fires remains in effect until the situation changes significantly, at which time another rule will fire. The logic is as for activity situations.

Satisfaction Effects: The magnitude of the resulting changes are scaled by the relevant factor.

Rule Set Summary: Satisfaction Effects

Rule Set	*p*	*q*	AUT	SFT	CUL	QOL
UNEMP	0.20	0.00	*nfactor* × S–	*nfactor* × M–		*ngfactor* × L–

UNEMP: Unemployment

Demographic Situation: A neighborhood group is affected by significant unemployment						
cause = UNEMP *p* = 0.25 *q* = 0.0		*n* = The affected neighborhood *g* = The affected civilian group *nfactor* = Magnitude of the unemployment problem in *n*, from 0.0 to 2.0 *ngfactor* = Magnitude of the unemployment problem for *g* in *n*, from 0.0 to 2.0				
Mitigated by: TBD.						
Affects civilian group *g* with non-zero factors in *n*.						
1. Situation Is Active	**Effect**	**AUT**	**SFT**	**CUL**	**QOL**	
1.1: Group suffering from unemployment. *nfactor* > 0.0 or *ngfactor* > 0.0	SLOPE	*nfactor* × S–	*nfactor* × M–		*ngfactor* × L–	
2: Situation is Inactive						
2.1: Group no longer suffering unemployment. *nfactor* > 0.0 or *ngfactor* > 0.0	SLOPE	Terminate slope effects				
Other Effects: None						

7. Service Situations

Service situations are circumstances driven by provision of service to civilian groups by actors. The groups respond to whether the provided level of service meets their needs, and to whether it meets their expectations. At present, the only service model in Athena is Essential Non-Infrastructure (ENI) Services.

Needs and Expectations Factors: Just as activity situations are driven by coverage fractions, service situations are driven by the needs factor, abbreviated "*needs*", and the expectations factor, abbreviated "*expectf*". The needs factor is a measure of whether and to what extent the actual level of service meets the group's needs. Its nominal range is from -2.0 to +2.0; it is -2.0 when the actual level of service is 0, 0.0 when the actual level of service is at the minimum required level of service, and 2.0 when the actual level of service is at or greater than the saturation level of service.

The expectations factor is a measure of whether the actual level of service is better or worse than expected; its nominal range is also from -2.0 to +2.0.

Rule Set Triggers: Actors provide services by executing tactics during strategy execution. This takes places once per week, and establishes the level of service for the following week. Consequently, service rule sets are triggered at the beginning of each strategy tock, at the same time as other situation rule sets.

It is not the case that a rule fires every time the rule set is triggered; rather, a rule that fires remains in effect until the situation changes significantly.

Satisfaction Effects: The magnitude of the resulting changes are scaled by the groups' *needs* and *expectf* factors.

Rule Set Summary: Satisfaction Effects

Rule Set	*p*	*q*	AUT	SFT	CUL	QOL
ENI	0.25	0.00	M+, M+	M+, M+	M+, M+	M+, M+

ENI: Essential Non-Infrastructure Services

Service Situation: A neighborhood group is affected by provision of ENI Services	
cause = ENI *p* = 0.25 *q* = 0.0	*g* = The affected civilian group *expectf* = The group's ENI expectations factor, from -2.0 to 2.0 *needs* = The group's ENI needs factor, from -2.0 to 2.0

Affects civilian group *g*.

1. Effects	**Effect**	**AUT**	**SFT**	**CUL**	**QOL**
1.1: ENI Services are less than required[10] *needs* < *0.0*	SLOPE	*expectf* × M+ + *needs* × *M+*	*expectf* × M+ + *needs* × *M+*	*expectf* × M+ + *needs* × *M+*	*expectf* × M+ + *needs* × *M+*
1.2: ENI Services are less than expected *needs* ≥ 0.0, *expectf* < 0.0	SLOPE	*expectf* × M+	*expectf* × M+	*expectf* × M+	*expectf* × M+
1.3: ENI Service are as expected *needs* ≥ 0.0, *expectf* = 0.0	SLOPE	Terminate Slopes			
1.1: ENI Service are better than expected *needs* ≥ 0.0, *expectf* > 0.0	SLOPE	*expectf* × M+	*expectf* × M+	*expectf* × M+	*expectf* × M+

Other Effects: None

[10] Note that the effect of *needs* is always negative in this case, despite the "+" on the magnitude symbols, since *needs* is negative.