OSAC Research Needs Assessment Form

Title of research need: Potential transformation of chlorate to perchlorate and visa-versa during explosion

Keywords: Transformation chlorate to perchlorate, transformation perchlorate to chlorate

Submitting subcommittee(s): Fire Debris & Explosives **Date Approved:** 5/12/2017

(If SAC review identifies additional subcommittees, add them to the box above.)

Background information:

1. Description of research need:

Explosions and detonations can produce temperatures of thousands of degrees. As a result, partial chemical transformation of the explosive, rather than complete decomposition, may occur. In the case of the oxidizers chlorate and perchlorate, the concern is that chemical transformation may result in the wrong chlorine oxidizer being identified as the principle reactant, thus, misleading the investigation. A study is needed to determine if chlorate <-> perchlorate transformations can occur during an explosion and to what extent they occur.

2. Key bibliographic references relating to this research need:

Alvisi, U. "Experimental investigations about new explosion and detonation materials" Gazzetta Chimica Italiana, 1899, 29, II, 478-90.

3a. In what ways would the research results improve current laboratory capabilities?

The results of this research would provide the analyst with guidance as to the proper way to report an explosion involving chlorine oxides.

3b. In what ways would the research results improve understanding of the scientific basis for the subcommittee(s)?

The proposed project addresses the question of whether post-blast explosive transformation products can be used reliably as evidence of the original oxidizer. In the case of chlorate to perchlorate, it is known this transformation occurs electrochemically. If this transformation occurs readily with heat, then this fact should be known by forensic analysts and investigators.

3c. In what ways would the research results improve services to the criminal justice system?

Forensic scientists can provide accurate and precise information to the scene investigators regarding the type of oxidizer used.

4. Status assessment (I, II, III, or IV): III

	Major gap in current knowledge	**Minor** gap in current knowledge
No or limited current research is being conducted	**I**	**III**
Existing current research is being conducted	**II**	**IV**

This research need has been identified by one or more subcommittees of OSAC and is being provided as an informational resource to the community.

Subcommittee Approval date: 5/26/2017

(Approval is by majority vote of subcommittee. Once approved, forward to SAC.)

SAC

1. Does the SAC agree with the research need? Yes (Yes) NO (NO)

2. Does the SAC agree with the status assessment? Yes (Yes) NO (NO)

If no, what is the status assessment of the SAC:

Approval date: 12Feb2018 [SAC voted yes to both questions]

(Approval is by majority vote of SAC. Once approved, forward to NIST for posting.)