The following is a list of suitable replacements for lines of code in the secAES-ATmega8515 assembly file for XMEGA:

- CLR r0
    - Clears the register
    - Can be rewritten as
        - EOR r0, r0 (alternatively AND r0, 0x00)
    - Replaced on lines 373, 374, 375, 376, 377, 390, 435, 436, 437, 438, 439, 440, 899
- DEC r0
    - Decreases the value held by a register
    - Can be rewritten as
        - SUBI r0, 0x01
    - Rewritten on lines 431, 913
- INC r0
    - Increases the value held by a register
    - Can be rewritten as
        - ADDI r0, 0x01
- MOVW r0, r1
    - Copies information held by r1 to r0
    - Can be rewritten as
        - EOR r0, r0
        - ADD r0, r1
    - Replaced on line 396, 404, 902, 903
- MOV r0, r1
    - Copies information held by r1 to r0
    - Can be rewritten as
        - EOR r0, r0
        - ADD r0, r1
    - Replaced on lines 412, 413, 416
- ADIW r0, 16
    - Adds 16 to the value in r16
    - Can be rewritten as
        - NEG r0
        - SUBI r0, 16
        - NEG r0
    - Replaced on line 382

- After replacing the above instructions in the AES assembly file, I tested the code to make sure that it still encrypted information properly. I got the following results:
    - Input Text: 4e ae 5c 85 f7 27 cb 2b 82 bb a8 ad f1 5b 14 69
    - Key: 2b 7e 15 16 28 ae d2 a6 ab f7 15 88 09 cf 4f 3c
    - Expected Output Text: 76 81 16 ce 57 30 67 93 1b 9b 99 14 89 69 06 74
    - Actual Output Text: 76 81 16 ce 57 30 67 93 1b 9b 99 14 89 69 06 74
- The code that I used to test functionality was:

```
# Testing values

key = bytearray(b'\x2b\x7e\x15\x16\x28\xae\xd2\xa6\xab\xf7\x15\x88\x09\xcf\x4f\x3c')

text = bytearray(b'\x4e\xae\x5c\x85\xf7\x27\xcb\x2b\x82\xbb\xa8\xad\xf1\x5b\x14\x69')

expected = bytearray(b'\x76\x81\x16\xce\x57\x30\x67\x93\x1b\x9b\x99\x14\x89\x69\x06\x74')

target.set_key(key)

target.simpleserial_write('p', text)

response = target.simpleserial_read('r', 16)



if expected == response:

        print("SUCCESS: Operation has no effect.")

else:

        print("FAILURE: Operation has an effect.")
```